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NetworkWorld

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200

The NW200 in decline

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The GN9120 system lets you get away from meetings via speakerphone.

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The NW200 in decline

Fraud. Scandal. Bankruptcy. The Network World 200 — the biggest names in networking — stumble through 2002.

- THE TOP 200 DOMESTIC PUBLIC NETWORK COMPANIES RANKED BY REVENUE.
- THE MOST PRODUCTIVE AND FASTEST GROWING NW200 COMPANIES.
- A RUNDOWN OF THE LAST YEAR, PLUS SUMMARIES OF HOW THE ENTERPRISE APPLICATION, INFRASTRUCTURE AND SERVICE PROVIDER SECTORS FARED.
- A LOOK AT NEW CORPORATE GOVERNANCE PRACTICES.
- PLUS, 10 START-UPS TO WATCH.

Begins on page 45.

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Topic notes

Our topic-specific news pages now not only have the latest news and research you need on your interests, but also feature analysis and commentary from our editors who know the areas best. This week Senior Editor Ellen Messmer takes a look at security information management and buyers' opinions of this new market.
DocFinder: 5547

Wireless LAN Buyer's Guide

In the market for WLAN gear? Compare and contrast 185 WLAN switches, gateways, antennas and more. **DocFinder: 4931**

Network Encyclopedia

Get definitions for the technologies, hardware, protocols, standards and more behind networking.
DocFinder: 5548

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Columnists

Compendium

The real wireless security worry
Fusion Executive Editor Adam Gaffin introduces you to Phil Windley, who says man-in-the-middle attacks should concern you more than wired equivalent privacy cracking. Learn what it is and how to stop it. **DocFinder: 5549**

Telework Beat

Telework world update
Net.Worker Managing Editor Toni Kistner does some digging to see which state and federal telework initiatives are back on track, treading water or stalled. **DocFinder: 5550**

Small Business Tech

Collaboration suite packs strong security
Columnist James Gaskin examines Plethora Technology's new version of its remote access and collaboration software.
DocFinder: 5551

Home Base

Blogging for business
Columnist Jeff Zbar talks of a consultant who replaced his Web site with a blog and the rationale behind the decision.
DocFinder: 5552

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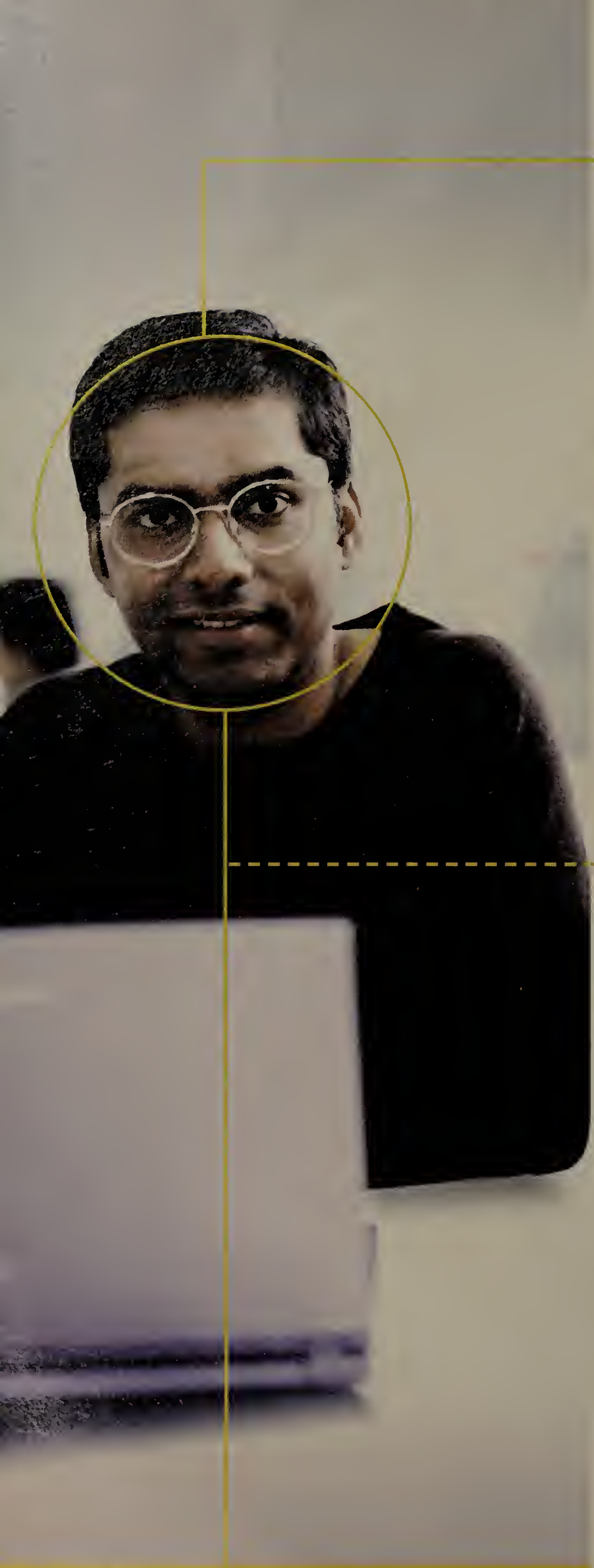

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ENTERASYS NETWORKS™

News

WorldCom unveils new name, services

Company, now called MCI, files three-year reorganization plan.

BY DENISE PAPPALARDO

ASHBURN, VA. — Despite industry skepticism about WorldCom's future, new data services and a strong reliance on its IP backbone will be at the heart of the carrier's reorganization as it emerges from Chapter 11 proceedings later this year.

As expected, WorldCom last week filed its in bankruptcy court its three-year plan, which included its corporate name change to MCI. In addition to laying out plans for its future, the carrier said it will launch three services next week and is in the process of beefing up its core network.

"We know we have a lot of work to do," said Michael Capellas, CEO at MCI. "In addition to it being the last day of our 100-day plan, it's the first day on the execution of our three-year plan."

In that vein the carrier says it will launch two bundles for small and midsize businesses (SMB). The first, Business Complete, will combine unlimited local and long-distance voice and DSL for one flat rate, says Ron McMurtrie, vice president of global marketing at MCI. The carrier also will roll out its MCI Business Solutions service bundles for midsize businesses.

The Business Solutions packages will include dedicated data services, such as DSL or fractional T-1 Internet connectivity, plus customer premises gear.

These are not MCI's first services targeted at this market, but they will be supported exclusively over MCI local facilities throughout the country. The carrier teamed with V-Tel in the past, but it now is supporting the services over its own local networks. This eliminates third-party suppliers and reduces costs for MCI because it will absorb all of the service revenues.

MCI also has established an internal sales force to address the SMB market. Most interexchange carriers (IXC) typically address the majority of these customers through sales channels and value-added resellers.

The carrier also is set to launch a VPN service next week at NetWorld+Interop in Las Vegas that "blends private and public networks," McMurtrie says.

The service, called Secure Interworking Gateway, will let customers set up corporate VPNs that use a variety of technologies, such as frame relay, public IP, ATM and DSL, to access secure networks. Users will not have to standardize on one or two access methods, but instead choose the best technology for

See Reorganization, page 16

"We know we have a lot of work to do."

Michael Capellas
CEO, MCI

So what's changed?

Company officials last week detailed MCI's plans. They include:

- Changing the company's name from tarnished WorldCom to MCI.
- Moving headquarters from Clinton, Miss., to Ashburn, Va.
- A three-year reorganization plan focusing on rebuilding revenues.
- Beginning migration to all-IP network core, with 36 multiservice switches deployed by the end of April.
- Ramping up managed services development engine.
- Setting third-quarter target to emerge from bankruptcy.

NetworkWorld Review

Microsoft Windows Server 2003

New OS is faster, safer to manage

BY TOM HENDERSON, NETWORK WORLD GLOBAL TEST ALLIANCE

We tested Windows Server 2003, which officially launches this week, and found that Microsoft's new server operating system delivers better performance, tighter security and easier management than its predecessor.

Windows 2003 also provides increased support for managing storage-area networks and makes it easier for customers to build Web services.

This product had been named .Net Server, part of Microsoft's plan to brand all its server products under the .Net Web services umbrella.

The name has changed, but Windows 2003 still maintains a strong Web services hooks. Services created within the .Net framework can take advantage of network, administration and management features built into Windows 2003.

We used Microsoft's Visual-Studio.Net tool and plug-ins from third parties such as Eiffel's ENVision to build a simple Active Server Pages Web application that monitored growth in a series of subfolders. Via a Web page, we watched the subfolder grow, change colors and flash when growth reached a predefined "critical" stage.

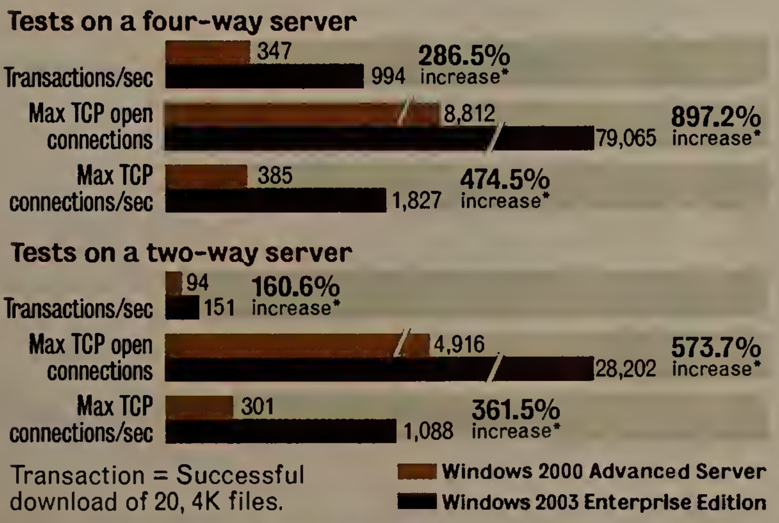
The application easily could be distributed by policy to other servers, then communicate with a "console page" if desired. Such applications were easily distributed and posted so they could be shared, used and, if desired, modified by others.

Microsoft added User Descrip-

See Server 2003, page 18

Microsoft hits Web performance head on

Microsoft's efforts to drive HTTP-processing down to the kernel level is paying off. Windows 2003 racked up impressive gains over Windows 2000 in our performance tests.



Transaction = Successful download of 20, 4K files.

Tap into complete Web performance data. DocFinder: 5553 www.nwfusion.com

* Denotes a normalized percentage as each test was run a minimum of seven times.

SHOW PLANNER 2003

NetWorld+ Interop Las Vegas is the place to see some of the latest technologies tested in real-world environments. Peruse our Show Planner to see what you shouldn't miss.

Page 37

NewsBits

BRIAN GAIDRY

TheGoodTheBadTheUgly

AOL Time Warner v. John Doe. AOL has filed five separate lawsuits targeting more than a dozen companies and individuals it accuses of sending an estimated 1 billion junk e-mails to AOL subscribers. AOL says the spam, involving pitches for everything from mortgages to porn, has generated 8 million complaints from its customers. One challenge for AOL's lawyers is that many of the alleged perpetrators are being called "John Doe" because their identities are unknown.

Raising the bar code. Anticapitalist protesters/cyberpranksters had Wal-Mart in a tizzy over a Web site that encouraged visitors to "name their own prices" by printing substitute bar codes. But Wal-Mart won out, sending its lawyers after the company hosting the site, which has been shut down.

Making the most of it. Here's 3Com CEO Bruce Claflin's take on the state of networking: "The industry is an ugly place. If you think it will get better and lift you out of your doldrums, that's a risky strategy. We felt we had to take our destiny in own hands, create our own growth scenario by investing heavily and taking share from other people. Fortunately, we have the cash resources to do this."

Enterasys snaps up Tenor's routing smarts

■ Enterasys Networks last week said it is buying the intellectual property of failed Multi-protocol Label Switching start-up Tenor Networks, a move aimed at developing the routing expertise at the Cabletron spin-off. The deal, terms of which were not disclosed, also brings Tenor cofounder Leon Woo to Enterasys as executive vice president of engineering. He will manage worldwide research and development. Tenor's MPLS and IP routing technologies will be integrated into Enterasys' line of enterprise routers, which compete with products from Cisco, Nortel and Allied Telesyn.

Cisco shows Wi-Fi VoIP phone

■ Cisco last week displayed a Wi-Fi IP phone at its channel partners conference that the company says will ship in June. The Cisco 7920 is an 802.11b IP phone that will work with Cisco's CallManager IP PBX, letting users have phone access and all IP PBX features while roaming in a Cisco-based Wi-Fi network. Slightly larger than a cell phone, the device will have about a two-hour battery life, Cisco said. The company also is talking with mobile phone vendors for integrating cell phone technology into the device. Pricing for the 7920 has not been set.

FTC takes aim at spammer

■ For the first time, the Federal Trade Commission has asked a judge to block a spam operation that allegedly uses deceptive subject lines to drive customers to an adult Web site. A spokeswoman for the agency promised more such lawsuits against spammers. According to court documents, the spam operation generated 46,000 complaints to the FTC in the past nine months. The FTC asked the court to halt unsolicited e-mail coming from an operation owned by Brian Westby, a resident of suburban St. Louis. He has registered more than 20 adult-themed Web domains. The agency accuses Westby of running a spamming operation that sends e-mail with subject lines such as "Did you hear the news" and "New movie info," but contains sexually explicit material. An FTC press release said children and workers at companies with antipornography policies might have been inadvertently exposed to the contents of those e-mails. Westby could not be reached for comment.

COMPENDIUM

Content pipelines

There's this vast sea of information out there. And that's just on your desktop. Clemens Vasters proposes XML-based "content pipelines" to try to link all these disparate sources of information — he'd push content through a series of stages, or modules, that would look at all the available information feeds and add relevant hooks to that information.

Find more of Compendium at www.nwfusion.com, DocFinder: 5554.

Microsoft reports progress on antitrust front

■ Microsoft has begun to take steps to prevent antitrust settlement violations, including employee training programs, as part of the agreement it reached with the U.S. government in November. Microsoft detailed the measures in a joint status report it filed last week with plaintiffs in the case in the U.S. District Court for the District of Columbia. The company also took pains to outline information-sharing agreements between the parties that protect its proprietary information from leaking to the public.

The status report is presumably the first of many to be filed in the wake of the landmark antitrust case, in which the software maker was found to be a monopoly. As part of the settlement deal, Microsoft now has to put a series of protections in place, including unbundling its middleware, sharing some source code and taking an even-handed approach with PC makers.

AT&T boosts service guarantees

■ AT&T this week launched an umbrella service for large-enterprise customers that promises predictability and reliability for local and long-haul connectivity. The interexchange carrier's High Performance Access Service offers users an end-to-end 99.999% network availability and reliability guarantee. The guarantee is for the carrier's largest customers with dedicated connectivity between OC-3, 155M bit/sec, and OC-192, 10G bit/sec. Initially, AT&T is targeting its largest business customers that have very high-bandwidth requirements, such as those in the financial services industry. HiPAS is available in AT&T's 67 local service markets nationwide, but the carrier says it will offer the performance guarantee for local connectivity over other service providers' networks.

EMC purchases Astrum Software

■ EMC last week augmented its storage resource management software portfolio by buying privately held Astrum Software for an undisclosed sum. With the acquisition, EMC could provide midtier customers, which typically buy Clariion arrays, with a more comprehensive view of their storage resources and simplify the implementation and management of networked storage, says Barry Ader, director of open software marketing at EMC. EMC will inherit Astrum's SRM products for multiplatform, midtier storage environments and 30 employees. Customers will start seeing Astrum's SRM products in EMC storage-area network products soon, Ader says.

Invensys to shed assets, including Baan

■ Long-suffering Invensys last week unveiled plans to offload more than half its remaining business units, including its Baan software division. The conglomerate, which provides software and systems for controls and automation equipment, says it's shedding the holdings in its core energy-management division to reduce debt. As a result, Baan — which offers ERP, CRM, supply-chain management, and production life cycle management products — will change hands for the second time in three years.

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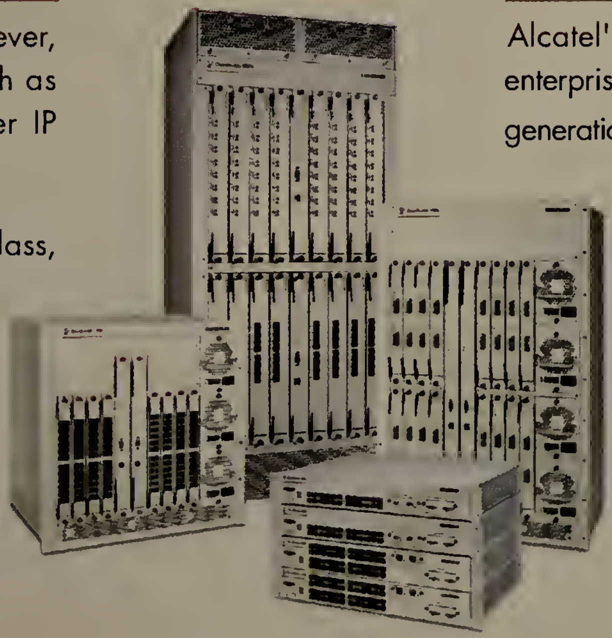

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LAN gear offers new twist to switching

■ BY PHIL HOCHMUTH

Stacking technology lets multiple Cisco Catalyst 3750s act as a single backbone with 32G bit/sec of bandwidth between switches.

Whether an organization's LAN switch plans call for gear that's inside or outside the box, new products from Enterasys and Cisco are aiming to satisfy both camps.

Ethernet switch gear from these vendors promise faster, more resilient LANs, but they deliver through different approaches.

With its new Matrix N-Series Chassis, Enterasys now has a full-scale 10 Gigabit LAN core box, while Cisco is offering a way to tie together Catalyst stackable switches to form a more flexible LAN edge or distribution layer.

Enterasys this week introduced its Matrix N-7 and N-3 chassis and modules built around the vendor's N-Series ASIC technology. The blades allow for greater 10G Ethernet throughput and finer control of quality of service (QoS), security and management of Wi-Fi clients.

The Matrix N-7 supports up to 20G bit/sec of bandwidth between its line cards, allowing for full-duplex 10G Ethernet throughput from port to port. Previous Matrix switches were limited to 6.5G bit/sec of bandwidth between cards in a chassis, or about 65% throughput for a 10G Ethernet port.

Strength and intelligence

New switch architecture in the N-Series boxes allows for more resiliency and easier configuration, the company says. Instead of one centralized management or switch fabric module, the N-Series boxes distribute switching intelligence to all blades in the chassis, Enterasys says. This means any number of modules could fail while the rest of the box's ports remain active.

Most architectures use redundant management modules that offer more limited redundancy while taking up room in the chassis for connectivity blades, says Bill Clark, Enterasys' director of product marketing.

While 10 Gigabit isn't on most network managers' to-do lists (see story at www.nwfusion.com, DocFinder: 5554), one user has waited for Enterasys to offer a full 10G Ethernet pipe.

"I'm one of those people who can chew up that higher bandwidth," says James Weidel, director of networking at the University of Southern California. Deployed at USC's campus in Los Angeles is a mesh of Gigabit Ethernet switches from Enterasys (and Cabletron, which spun off Enterasys). Weidel says he'd like to upgrade to 10G Ethernet and extend Gigabit links to more desktops.

"The backplane on everybody's switches are a limitation for 10 Gigabit," Weidel says, "but the vendors seem to be playing catch-up in that area now."

Policy assignment

Another feature added to the N-Series ASICs is the ability to enforce up to 64,000 unique network policies to IP traffic flows, based on Layer 3 (IP address) and Layer 4 (TCP, User Datagram Protocol port) packet information. Policies could include QoS prioritization of specific end-user or application traffic, or the denial of certain IP addresses to network resources or segments. The previous series of Matrix Layer 2-Layer 4 switches were limited to 1,000 policies.

Different policies also can be assigned to multiple end-users attached to a LAN from the same network port. This allows multiple wireless LAN users, who access the network via a single WLAN endpoint, to be assigned different levels of security, network rights and bandwidth service levels.

Enterasys' Clark says a three-slot Matrix N-3 chassis would let a user integrate many of the features touted in new WLAN switch products — from such vendors as Trapeze and Aruba — into one wiring closet box.

Big chassis alternative

Cisco's Catalyst 3750 represents an alternative to a big chassis switch in the LAN core and edge — which has been the company's strategy. With the Catalyst 3750 comes StackWise technology, which lets up to nine Catalyst 3750s — supporting 24 or 48 10/100/1000M bit/sec ports — be stacked into a virtual chassis, with 32G bit/sec of bandwidth between each box provided through trunked Gigabit Ethernet ports. Cisco's previous stacking architecture allowed for a 1G bit/sec of interswitch bandwidth.

A stack of Catalyst 3750s could be deployed in a wiring closet for high-density desktop connections, or in a data center for supplying servers with 100/1000-Base-T links, Cisco says.

The switches support routing protocols such as Open Shortest Path First, Router Information Protocol and Hot Standby Router Protocol for redundancy and intelligent traffic forwarding. In a StackWise configuration with routing, a single Catalyst 3750 acts as a master node, providing route table information. The master node also can fail over to other nodes in the stack. The boxes support both IP version 4 and 6, and run the same firmware as Cisco's Catalyst 3550 stackable boxes.

The Catalyst 3750 with StackWise costs $6,000.

The Matrix N7 chassis with redundant power supplies costs $10,500, and a redundant N3 is $5,500. Modules for the N-Series include a 30-port 10/100/1000 Ethernet blade for $20,000, a 48-port 10/100 blade for $13,000 and 12-port mini-gigabit interface converter module for $21,000. A dual-port 10G Ethernet module with swappable Xenpak optics will be available in third quarter, pricing to be determined. ■

Correction

■ The story "Router newcomers take on Cisco, Juniper" (April 14, page 14) should have described Procket Networks' Pro 8812 router as supporting 960G bit/sec of capacity and 1.2 billion packet/sec of forwarding in a half-rack configuration.

Start-up unveils WLAN router

■ BY JOHN COX

MISSISSAUGA, ONTARIO — Just when you thought you were starting to get a handle on wireless LAN switches, a new company introduces a WLAN router.

BeaconWorks, from Chantry Networks, is a Layer 3 router that uses a proprietary protocol to tunnel over the wired IP network to connect to a flock of companion access points.

As a router, the box can bypass failed nodes and find new pathways to keep a network up and running. Company officials say BeaconWorks will be able to move users automatically between WLANs and wide-area cellular networks without breaking their applications or forcing a new logon.

BeaconWorks consists of the BeaconMaster router and attendant BeaconPoints, which are streamlined wireless access points.

"When mobile users connect, they are assigned an IP address on a subnet managed by the BeaconMaster," says Bob Myers, CTO for Chantry. "BeaconMaster can then provide the routing. We support an array of routing protocols. A BeaconMaster can support hundreds of BeaconPoints and several thousand mobile users. We can handle the whole address space for the [enterprise] customer."

The spate of recently announced LAN switches from the likes of Aruba Networks and Trapeze Networks (www.nwfusion.com, DocFinder: 5539) tend to focus more on Layer 2 switching features, with additional Layer 3 features such as quality of service. Most but not all of these devices are designed for wiring closets. Chantry's is built for the data center or network operations center.

The router is being tested at Cornell University, which has 450 buildings on a sprawling 750-acre campus in Ithaca, N.Y. "You'd need more than one wireless switch for every building [based on a wiring closet approach]," Myers says. "[But] they can put out about 20 or 30 of our BeaconMasters right in the data center, where the network operations people are."

Chantry engineers designed a protocol that lets the BeaconPoints communicate with the routers over an IP network. "Mobile users connect to the access point and can roam to any other BeaconPoint in the network and maintain the same IP address," Myers says.

Aruba does something similar by using the familiar Generic Routing Encapsulation protocol, a technique that also lets the Aruba switch be installed in a data center. But Myers says that Chantry also has added a management protocol as part of the interaction between access point and router. "We can control the individual user at the 802.11 layer [because] we understand all those events at the BeaconMaster," he says.

The BeaconPoints can be distributed over a campus and managed remotely by the router. There is an 802.11b, 11M bit/sec version of the access point. Another version can house an 802.11a, 54M bit/sec radio and either an 802.11b or an 802.11g radio.

Both devices are schedule to ship in July. The access points will cost about $500. The BeaconMaster router will cost from $25,000 to $30,000, depending on the configuration selected. ■

No LAN is an island

Chantry Networks gets its name from Chantry Island, which sits off the Southampton coastline in Ontario and features a lighthouse from which Chantry's founders find inspiration.

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Novell pitches grand plans for Linux

■ **BY DENI CONNOR**

Novell's Linux initiative

A sampling of cross-platform products from Novell:

Product	Availability	Platform
NDS eDirectory	Now	Linux, OS/390, Windows, AIX, Solaris
GroupWise client	Now	Linux, Macintosh, Solaris, HP-UX, AIX, Windows
GroupWise server	Within 18 months	Linux
NetWare kernel	Within 18 months	Linux
NetWare file and print services	Within 18 months	Linux
iFolder	Now	Linux, Solaris, Windows
DirXML	Now	OS/390, Linux, Unix
NetMail	Now	Linux, Windows
ZENworks	Now	Linux, Windows

SALT LAKE CITY — Novell's announcement last week that it would migrate NetWare file and print. collaboration and security services to Linux could have created a lot more buzz among industry watchers and customers if only it had come sooner.

Instead, the move was met with a mixture of applause and skepticism.

Novell announced at its annual BrainShare user conference that it would continue to develop and support products and services for the NetWare operating system and also migrate them to the increasingly popular Linux platform.

"As Linux increases its presence in the corporate world, we are actively building out our services to work on Linux," says Jack Messman, Novell chairman and CEO. "It's all about choice. If customers want to go to Linux, we will get them there without a lot of pain and aggravation."

Within 18 months, Novell promised to introduce a raft of services that run natively on Linux. The first will be NetWare 7, code-named Uinta, a version of its flagship operating system that will be available on NetWare and Linux kernels.

"It's a fairly clever move, but only if they can pull it off," says Earl Perkins, an analyst for Meta Group. "Novell has had mixed results in the past being able to do these things. The big problem is we are looking at 18 months before they will have significant services working on Linux. It would have been better if they made this decision a little bit sooner."

Just last year Novell promised that NetWare would compete head to head with products from Microsoft and IBM thanks to its acquisition of Web services company SilverStream Software. In 1998, when Novell shipped NetWare 5, the company said it had a strong application server platform that could compete with Microsoft. However, those visions have gone unfulfilled.

Although Novell officials say they have not decided which Linux distribution the NetWare kernel will use, they say NetWare users have been asking for this capability.

"We see Linux as a good migration path for NetWare users, who were worried about where we were heading with NetWare and were worried that there might not be a migration path beyond a certain version," Messman says. "We wanted to give them comfort that they could get all the services they have with NetWare."

The company already has several products and services that run on Linux. Among the most prominent are eDirectory and ZENworks. At BrainShare, Novell showed off Linux products such as a client for GroupWise based on technology acquired from Newcomp Computer Systems and an alpha-version GroupWare server running on Linux.

Novell customers say the company really has no choice but to embrace Linux.

"It would be great if Novell just took everything they did and put it on Linux," says Peter Strifas, senior directory engineer for Mount Sinai-New York University Health Organization in New York. "The biggest problem we've been having lately is facing hardware vendors that don't have NetWare support. For example, HP doesn't support NetWare on its server blades. That was just enough for management to ask why we were keeping this stuff around."

Strifas manages about 60 NetWare servers and uses Novell's eDirectory and other tools.

Doug Spindler, an Active Directory services coordinator for Lawrence Berkeley National Laboratory in Livermore, Calif., also is encouraged by Novell's plans. Lawrence Berkeley deploys Linux clusters that have as many as 1,700 four-processor nodes for crunching scientific data.

"These [researchers] are very closely related to open source Linux," Spindler says. "If Novell keeps its NetWare Linux open and standard, Lawrence Berkeley may embrace this, but they also may not." Spindler's organization has 100 Windows and 25 NetWare servers providing core services.

"We are trying to consolidate services, so it doesn't make sense for each department to have its own applications, infrastructure and virus signatures," he says. "When it comes to the operating systems, it would be great if all of them ran on Linux. If Novell tries to domineer Linux vendors, affect open source and require that you use a Novell DNS server, that's not going to fly. Novell has to be a peer to other Linux vendors."

Novell says more than 5,000 people attended BrainShare this year, roughly the same as last year. ■

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Kubi moves collaboration into e-mail

Start-up's client software lets teams work together without leaving e-mail.

■ **BY JOHN FONTANA**

LINCOLN, MASS. — Start-up Kubi Software next week will release its first product: add-on software that turns popular e-mail clients into collaboration environments.

Kubi Client works within Microsoft Outlook 2000 and 2002 or Lotus Notes versions 5 and 6. It lets users create Kubi Spaces, a series of collaborative folders that support document sharing, discussions, group calendars, contact lists and project timelines.

Analysts and vendors recently have been promoting contextual collaboration, which is the ability to add collaborative components into other applications. While vendors such as Lotus and Microsoft have been talking about adding those components into applications such as CRM, Kubi has targeted the most popular application in use.

Microsoft and Lotus provide some collaborative features such as sharing of calendars and contact lists, but their e-mail clients primarily are designed to send, receive and store e-mail.

The key to Kubi is that it offers users a more sophisticated set of collaborative features without leaving their comfort zone: e-mail. It also allows collaboration among Outlook and Notes users.

"We know people use e-mail," says Shabbir Safdar, a Kubi beta tester and CTO of Mindshare Internet Campaigns, a communications firm that builds online campaigns for clients that lobby legislators or the public. "We've had a much harder time getting people to an extranet site to do collaboration."

Safdar says he has been searching for five years to find the right collaboration product.

"The challenge is not the technology, it's the adoption process. Building collaboration into Outlook means I don't have to train users on a new application. They are much more comfortable just exploring how to use a new feature," he says. Safdar points to the discussion form used by Kubi. "It looks just like a new mail message in Outlook. That alone saves about an hour of training," he says.

Users can start a Kubi Space with one click and, using their e-mail addresses, invite team members to join. Once users are invited, Kubi synchronizes data between team members and across both Outlook and Notes clients. Synchronization takes place via the Simple Mail Transfer Protocol, and all data is encrypted. Users can set up Kubi home pages in Outlook that display all their collaborative inboxes and their regular e-mail inboxes. The company is developing support for the Notes version of the home-page feature.

"I'm bullish on Kubi because our focus groups have shown that 90% to 95% of collaboration is still done in e-mail," says Robert Mahowald, research manager at IDC. "For people looking to extend their existing infrastructure this is a good product."

Kubi Client, which is a 3M-byte download, faces competition from Zaplet's Zaplet 3 and AppMail's AppMail.

In the fall, Kubi plans to add a server that will give corporations control over Kubi Client. The server would provide centralized storage of Kubi Spaces, policy controls and archiving capabilities. Kubi also plans to provide Web browser access for Kubi users.

Kubi, which runs on Windows only, is priced at $149 per copy. The company will offer volume discounts. ■

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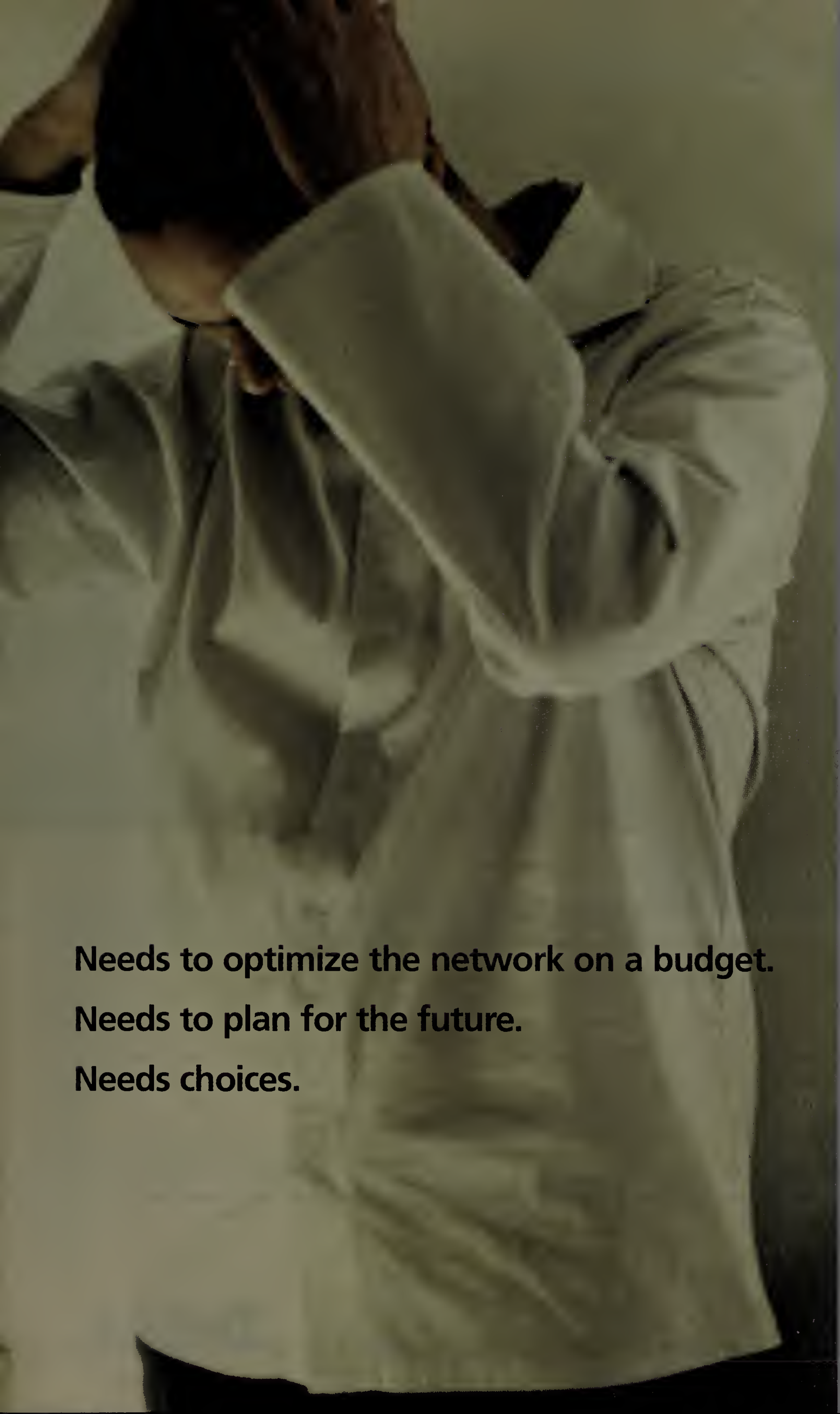
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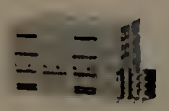
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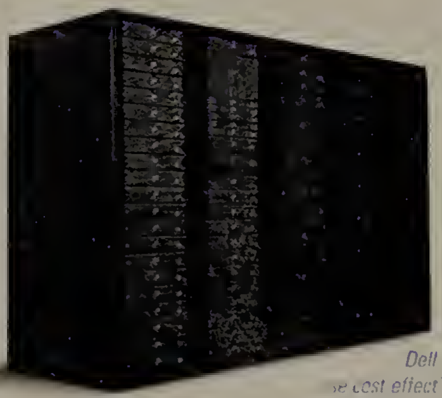

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[1] Tested by Dell in January 2003 on baseball database. Dell configurations: Dell PowerEdge 6650 server with four 2.0 GHz Xeon MP processors, Red Hat Linux Advanced Server 2.1, 3 Year Gold Support. Price: $32,701 (www.dell.com, 1/20/03) and Dell PowerEdge 2650 server with two 2.8 GHz Xeon DP processors, [illegible] memory, Windows 2000 Server, 3 Year Gold Support. Price: $9,324 (www.dell.com, 2/10/03). Sun configuration: Sun Fire V480 server with four 900 MHz UltraSPARC III processors, Solaris 9 (12/02 version). Price: $53,796 (www.sun.com, 3/17/03). 3 Year Gold Support. For details and results, see www.dell.com/migration.

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CA takes charge on security management

■ **BY ELLEN MESSMER**

SAN FRANCISCO — Computer Associates last week announced it is spearheading an effort to establish common industry specifications for building security information management products, which are used to gather and make sense of data from information-security equipment such as firewalls and physical security systems such as electronic badge-readers.

With the RSA Conference as a backdrop, CA Executive Vice President Russ Artzt introduced the Open Security Exchange, flanked by executives from initial backers Tyco Safety Products, Pinkerton, Gemplus and HID. Although these physical security vendors say they are in CA's camp, the rest of the industry has yet to endorse the group.

CA's bid to close the gap between physical and information security reflects some real-world concerns inside large organizations . . .

"This will change by July at the CA World conference," Artzt pledged. CA is wooing Check Point Software, Cisco, IBM and Symantec, among others, he said.

The group's initial goal is to develop core specifications for a "common credential," whether in smart card or other form, which could be used for physical access through doors and cybersecurity access to networks. The specification would describe a common management framework so critical information from distributed devices could be shared at a single console that also could be used to control and audit those devices.

CA is developing two SIM products, Command Center for cybersecurity and eTrust 20/20 for physical security, set to be unveiled later this year.

While CA's products will use the new group's specifications, the forum is destined not to have broad effect until it gains other members. "Without expanding to other players, success will be difficult," said Alex Mandl, CEO of smart-card manufacturer Gemplus.

CA's bid to close the gap between physical and information security reflects some real-world concerns inside large organizations such as the Department of Defense.

In what remains an uphill battle despite years of planning, the Defense Department has issued 2 million of its public-key infrastructure (PKI)-based "Common Access" smart cards to military personnel, with 2 million more expected by year-end. About 400,000 people enter or leave military ranks each year, which is giving the Defense Department a workout on issuing and revoking these cards.

The cards are supposed to be used for both workstation access — e-business signing and encryption of documents — and physical building access.

But the full network and application prerequisites are not in place around the world to take total advantage of the cards' capabilities, said Mary Dixon, director of the Defense Department's access-card office, during a presentation at the RSA Conference.

"We now have about 150,000 workstations with logical access and logon for the cards," Dixon said. "We're shifting our focus to usage."

The military has only begun to address the use of the Common Access card for physical security. But a lot of these issues might not be worked out until the next version of the card is completed. That version will likely contain support for biometrics, perhaps including fingerprint or iris scans and the person's PKI certificate.

The Department of Homeland Security is working closely with the Defense Department on the design of the Common Access 2.0 card, says Joseph Broghamer, senior security architect in the office of the CIO at the newly formed agency.

He now uses a dozen different cards or badge readers to get into his computer, the Pentagon, different federal agencies and parts of the White House. One card would be better, particularly because sometimes the identification cards and readers aren't properly revoked in a timely way, he says. ■

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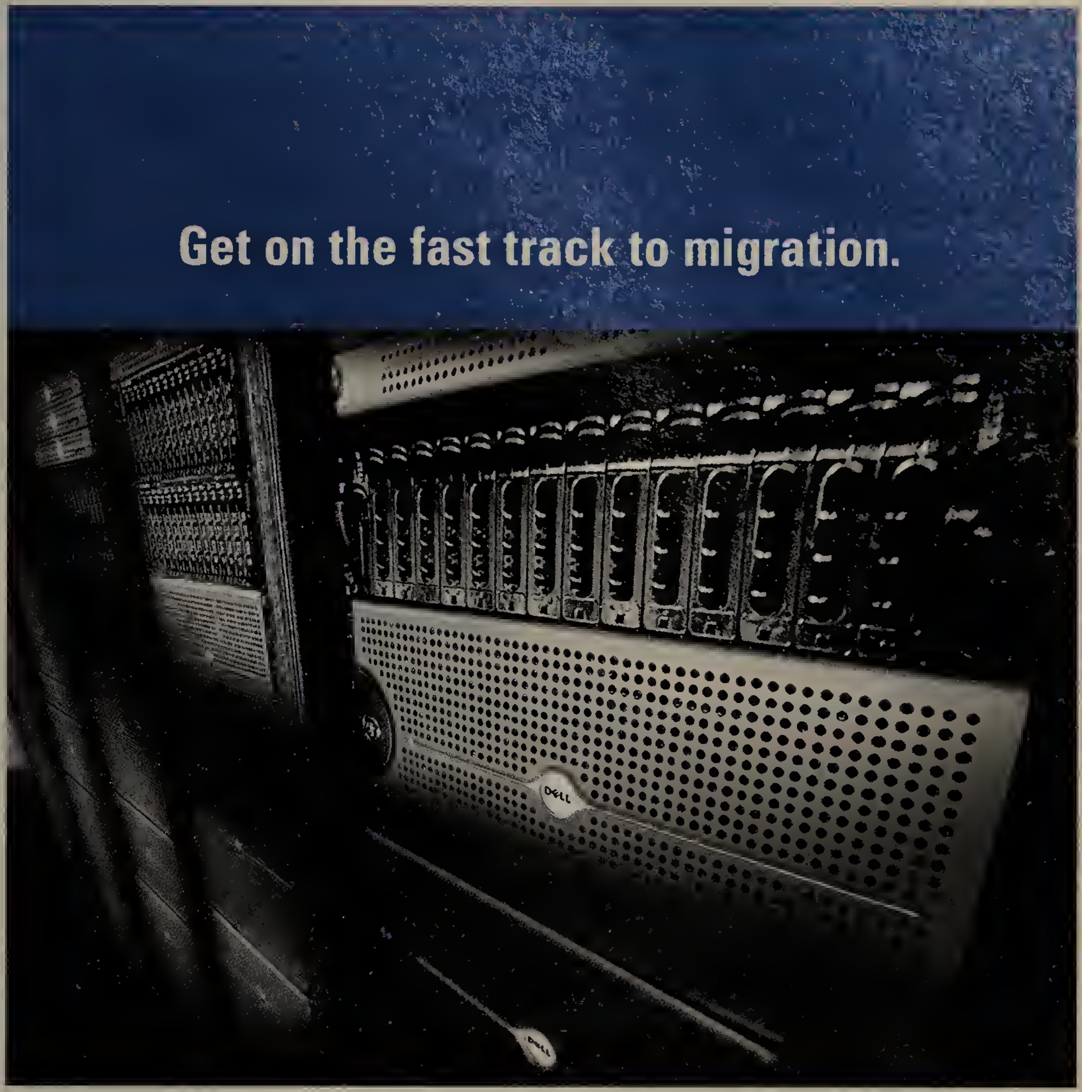

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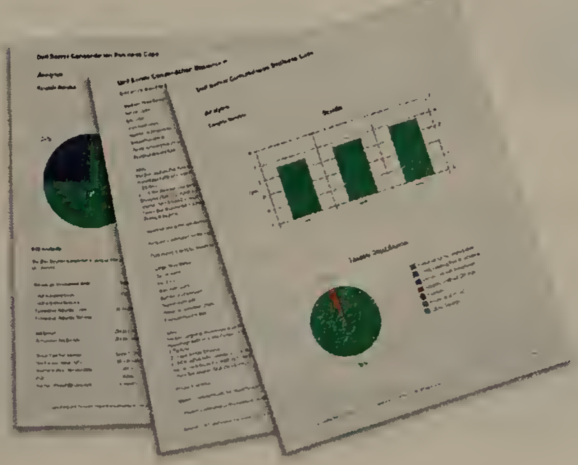

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AMD touts new twist for 64-bit servers

BY JENNIFER MEARS

SUNNYVALE, CALIF. — Advanced Micro Devices this week is set to unveil its Opteron chip, which the company says will make it easier for businesses to transition to more-powerful 64-bit servers that can support increasingly demanding applications.

The twist with the Opteron is that it uses the x86 instruction set with 64-bit extensions, meaning it can run 32- and 64-bit applications simultaneously. That's good news for corporate customers that might have been reluctant to make the move to 64-bit computing because of the need to recompile existing 32-bit applications.

"We don't expect people to throw away their huge investments in 32-bit computing," says Marty Seyer, vice president of AMD's server business.

That contrasts with Intel's 64-bit Itanium, which Intel says runs 32-bit applications but with performance degradation. The focus behind Itanium, however, has been on providing a reliable, secure and scalable alternative to 64-bit RISC processors, says Mark Hudson, vice president of marketing for business-critical systems at HP, which helped develop Itanium.

For its part, HP remains committed to Itanium and last week announced growing independent software vendor and customer support for its Itanium products.

"We're light years ahead as far as getting an ecosystem built around Itanium. For Opteron, they haven't even started," Hudson says.

AMD concedes that Opteron will not compete with Itanium, initially at least, but rather is an alternative migration path for businesses considering a move to 64-bit computing.

"They're competing in the one-way, two-way Xeon space where they think customers who may find a need for 64-bit computing will be able to do so easily, first using their 32-bit capabilities and then moving up into the 64-bit realm," says Vernon Turner, group vice president of IDC's Global Enterprise Server Solutions. "They're providing . . . 32-bit and 64-bit capabilities at industry-standard prices."

The two-way Opteron processor will be available this week while the one-way and eight-way processors will ship later in the second quarter with prices for both on par with Intel's 32-bit Xeon processor, Seyer says. IBM's two-way Xeon-based xSeries 235 starts about $1,800.

AMD's entry into 64-bit computing won't be easy. Analysts and users note that while AMD is entering the market with a competitive approach, it still must garner the support of a Tier 1 systems vendor such as IBM or HP to really make headway in the enterprise market. In the x86 market, AMD accounts for just 2% or 3% of shipment revenues, according to IDC. Intel accounts for the rest.

The major server vendors say they have looked at the Opteron, but none have committed to putting the processor into their boxes. Sun is evaluating Opteron for possible inclusion in its products, but "there are currently no plans to use AMD's Opteron processor in our existing product line," Sun says.

Opteron is not without some big-name support. Microsoft earlier this month announced that Windows Server 2003 would support Opteron, Red Hat has said its Linux will run on the processor, and IBM last summer ported its DB2 software to run on the chip.

AMD also has announced that several second-tier systems vendors, such as Penguin Computing and RackSaver, plan to use the Opteron processor. Idaho National Engineering and Environmental Laboratory is testing an Opteron system from RackSaver that was designed by AMD partner Newisys.

The laboratory is using the system to run scientific and engineering codes that address memory-related problems in other environments, says Andrew Shewmaker, associate engineer at the laboratory in Idaho Falls. "The code already ran on x86 Linux and required only to build script modifications to compile on x86-64," he says.

Memory limitations within 32-bit platforms have users looking to move into 64-bit environments, says Nathan Brookwood, principal analyst at Insight 64. Thirty-two-bit processors can address 4G bytes of memory.

"Once you start bumping up against that limit your software starts to run into problems," Brookwood says. "You can't utilize all the memory that you need and can afford to put on those machines. Then users say, 'Wait a minute I need more memory but I can't use it. What am I going to do?' Sixty-four-bit solves that problem." ■

Freedom of choice

AMD says its Opteron server chip, based on industry standard x86 architecture, will:

- Support simultaneous 32-bit and 64-bit computing.
- Enable easier migration to 64-bit computing.
- Provide users with 64-bit computing power at 32-bit prices.

Reorganization

continued from page 7

sites accessing their corporate VPNs.

Edge and local routers will stay in place, but the gateway service will let traffic be handed off to the IP core, McMurtrie says.

This is one example of how the carrier will roll out new services that take advantage of its consolidated IP network. MCI is in the process of migrating all its data networks to a single IP core, says Fred Briggs, CTO. It is deploying 36 multiservice switches throughout its data network to the IP backbone that will transport all traffic. Briggs says the switches will be in place by the end of the month.

Supporting one backbone that all other access networks can bleed into eases management and reduces costs, experts say. It's also a step other IXCs have taken.

MCI has been slow to migrate its core to IP, says Mark Winther, group vice president at IDC. "It's understandable because of the company's financial paralysis, but it's what they should have already started," he says.

> **"MCI has a deep hole to crawl out of. Capellas has cleaned house and is doing the best he can."**
>
> **Mark Winther**
> Group vice president, IDC

AT&T is well under way and has been talking about IP and Multi-protocol Label Switching in the core for more than a year, Winther says. Sprint is doing the same, but with IP and ATM at the core, he says.

Even though MCI might be behind its competitors, the company says it is moving aggressively. The edge switches will let the carrier support its frame relay, ATM, private line and voice traffic over its IP backbone. It plans to transport at least 25% of its voice traffic over its IP core by the end of 2004, Briggs says.

"The best thing for [MCI] to leverage is its IP network," says David Willis, vice president of infrastructure strategies at Meta Group. "They have the best public IP network in UUNET, which is now the core of the company."

Facing uncertainty

While the company's mood was upbeat last week as it announced the completion of its 100-day plan and the filing of its three-year reorganization plan, MCI faces much uncertainty.

"[MCI] has a deep hole to crawl out of. Capellas has cleaned house and is doing the best he can. The company is positive and upbeat," Winther says. "But I'm skeptical about the company's ability to increase revenues and capture new business."

MCI says that's exactly what it will do. Although its revenue for 2003 is expected to be $24.5 billion, down 14% compared with last year, the carrier says there will be growth in 2004 and 2005. MCI's disclosure statement, which was filed with the bankruptcy court, says revenue will grow by 4% next year to reach $25.8 billion and by 8% in 2005 to reach $27.8 billion.

Reliability, strong customer service and compelling services are what the carrier says will fuel the growth. Although MCI likes to point out that it hasn't lost any very large enterprise business customers since last year, it has lost customers overall (www.nwfusion.com, DocFinder: 5542). The carrier's falling revenue only further proves that some customers have left.

But MCI is expecting strong growth in business services as it rolls out offerings to address this market. "We are building out our managed services product line, which is now getting invested in again," McMurtrie says. "We had a very strong heritage in product development. That engine has been quiet this last year. We're going to change that."

McMurtrie added that the company does not plan to start a price war.

Although Meta's Willis says the carrier has reduced rates during contract negotiations to keep existing customers, MCI says it will not cut rates just to win new business.

But considering the telecom market and MCI's bankruptcy, analysts question the company's ability to grow. While customers that have stuck by MCI say it is keeping up with demand and reliability, some question how long it can keep up.

"For a company with $24 billion in revenue, I would expect them to put about $2 billion in capital into the network. Currently they are investing about $800 million," Willis says. "They are starving the network, which could affect reliability going forward."

The company says its capital expenditures will total $1.2 billion by year-end and $2 billion annually by 2005.

MCI could come out of bankruptcy in the third quarter with about $32 billion of debt wiped clean off its balance sheet. But the carrier expects to have about $4.5 to $5.5 billion in debt at that time. ■

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Server 2003

continued from page 7

tion Discovery and Integration support to Active Directory. UDDI is a registry and discovery/proxy service for applications that helps the operating system locate resources on local and remote servers. We tested support for this Web services feature, and it worked well.

Web performance boost

Microsoft says it has rewritten most of the Internet Information Server code that comes bundled with Windows 2003. Our tests showed that effort has produced dramatic results. We used Spirent Communications' WebAvalanche to test the total number of connections per second, maximum number of transactions per second, and maximum number of open connections per second on Windows Advanced Server 2000 and Windows 2003 Enterprise Edition. We ran them on three different levels of server — configured at the defaults without optimizing either platform (see "How we did it" at www.nwfusion.com, DocFinder: 5545).

The biggest performance gains came in TCP performance. In our maximum TCP connection test, which measures the capacity of the server to respond or TCP session requests, the numbers for Win 2003 came in almost 900% higher than those of Win 2000. In a more stringent transactional test, in which we tested static Web page transaction cycles — downloading 40 text pages per transaction with pauses — Win 2003 showed improvements in performance ranging from 161% to 287% depending on which hardware server we used to conduct the test.

In an Intel IOMeter test between Win 2000 and Win 2003 running on the same hardware, we saw a 31% increase in number of I/Os per second on Win 2003 — with no optimizations on either platform.

Moving on to management

Microsoft has added a wizard that controls the Microsoft Management Console (MMC) called Manage Your Server. This application serves as a gateway to various server subsystems, including DNS, Dynamic Host Configuration Protocol, print, mail, VPNs, and Web and terminal services.

It was possible to build this kind of tool from MMC component views in the past, but the Manage Your Server application is convenient by contrast. If you're unfamiliar with the various components required to make the Active Directory and other services connect cohesively, you will appreciate this centralization of services options.

While Windows NT's multimaster domain model was full of problems, it has largely stabilized, and runs on machines often purchased years ago. This means that users have moved more slowly to Active Directory and Win 2000 than Microsoft would have preferred.

With the addition of Microsoft Metadirectory Services (MMS), implementing a new Active Directory scheme and migrating existing directories to a Microsoft world has been simplified. Gone are rigid directory forests with impenetrable trust relationships between them, replaced by more easily managed and inter-related directory forests and trees.

MMS — which originates in part through metadirectory smarts that Microsoft picked up when it acquired VIA Software and its metadirectory product, ZoomIt — visually connects and synchronizes a number of directory services. This gives administrators a single point to change user profiles and set security parameters.

MMS supports Lotus Notes/Domino, NetWare eDirectory, iPlanet and flat-file directory databases. We had no problems when we tested MMS with Active Directory; an importation of Novell's eDirectory with a 500-user testing directory database; and SQL Server 2000 database.

Group policies, a feature Microsoft pushed with Win 2000 and Active Directory that has been difficult for many administrators to embrace, has an important change: the ability for administrators to view and understand cumulative effects of user policy controls. We found this new utility, called Group Resultant Set of Policy (GRSP), removed much of the mystery of policy application and should aid policy administration, especially accessibility and security. For example, giving a user membership to multiple groups often results in conflicting accessibility and usage policies. The GRSP utility delivers a composite view of policy interactions, so conflicts can be sorted out.

It also was easy to graphically modify Active Directory schemas, as well as import, export and alter records through any Active Directory-based servers in the lab network with the MMS tools.

The storage story

It's easier to manage a storage-area network (SAN) with Win 2003 than prior editions. One console can be used to visually inspect, partition, share and place access boundaries on SAN resources — especially disk volumes. Microsoft now offers Virtual Disk Services, a set of APIs that drives a revamped replication service called Volume Shadow Service (VSS).

In our tests, we easily connected Win2003 to a JBOD SAN. We tested the VSS, which when combined with Automated System Recovery, let us restore our primary server's media in several simulated crashes — caused by yanking live boot media.

Crash recovery for a 40-gigabyte server boot drive took 14 minutes from start to finish, which is as fast or faster than other bare-metal restoration third-party applications that we've used with Win 2000.

We also configured a boot-on-SAN to let the server boot from the JBOD array. This lets organizations place huge amounts of storage against high-density, 1U Win 2003 Servers.

Microsoft's Backup program also has been changed to let volumes with open files be backed up; they were skipped in prior editions, so users had to procure third-party back-up tools and applications to do the simple yet mandatory job of server backup.

Security

Microsoft's security enhancements for Win 2003 lie in removing basic privileges that existed in previous versions. For example, Microsoft has made it tougher to get root hacks by lowering the operating level of service applications. By changing many classes of services that are part of a typical start — including IIS — to user roles instead of root user roles, these applications cannot exploit a server by having native root privileges.

Many services that formerly were started automatically and by default, such as Web and FTP services, now are defaulted to off, so they don't have to be turned off to be unavailable for surreptitious hacking.

Microsoft also bundles the Internet Authentication Server (IAS), which serves as a Remote Access Dial-In User Service server for proxy authentication into the operating system. IAS enables 802.1x authentication, which is popular in wireless network infrastructures. This version of the server operating system has much more to warm up to than 2000 Advanced Server, and lives gracefully in an ever-more heterogeneous network world. ■

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■ Net Results

Microsoft Windows Server 2003 Enterprise Edition

4.25
RATING

Company: Microsoft **Pros:** Improved Web server performance; advanced directory services management; increased security/storage options. **Cons:** Some drivers are outdated; mismatched feature sets upset level upgrade path.

What's the score?	Windows 2003 Enterprise Edition
Installation/integration 25%	4
Performance 25%	4
Management/administration 25%	5
Security 25%	4
TOTAL SCORE	4.25

Individual category scores are based on a scale of 1 to 5. **Percentages** are the weight given each category in determining the total score. ■ **Scoring Key: 5:** Exceptional showing in this category. Defines the standard of excellence. **4:** Very good showing. Although there may be room for improvement, this product was much better than the average. **3:** Average showing in this category. Product was neither especially good nor exceptionally bad. **2:** Below average. Lacked some features or lower performance than other products or than expected. **1:** Consistently subpar, or lacking features being reviewed.

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Short Takes

■ **Intel** recently demonstrated a prototype **ultrawideband radio system** transmitting data at more than 220M bit/sec. The transmitter and receiver pair, which Intel says are just out of the laboratory, achieved a sustained data rate of about 220M bit/sec over a distance of about 3.5 feet for approximately two hours while on display. The data rate is more than double that of a system Intel showed a year ago that worked at 100M bit/sec. UWB is a relatively new wireless technology that is still under development. Many companies are eyeing it as a system to connect computers to each other or nearby peripherals, and as a replacement for slower technologies such as Bluetooth. Commercial UWB products are expected on the market sometime in 2004 or 2005. Intel and several other companies at the IEEE 802.15 Working Group for Wireless Personal Area Networks are pushing the standard. UWB can achieve such high data transmission rates because it transmits data over a very large frequency spectrum. As approved by the FCC, it uses 7.5GHz of spectrum between 3.1GHz and 10.6GHz — an area more than 80 times as wide as that used by 802.11b wireless LANs and about 25 times as wide as the higher speed 802.11a technology.

■ **Inkra** is adding intrusion detection to the security functions its hardware platforms can perform, potentially reducing the number of devices businesses have to install to protect their networks. The features are being added to Inkra's 1500 series **Virtual Service Switches**, which already handle firewall, VPN, Secure Sockets Layer acceleration, server load balancing and monitoring and Web acceleration duties. The new hardware, the 1518, has 2G bit/sec throughput and four Gigabit Ethernet ports. It costs $35,000 for the standard software load and $40,000 for the security model. It is available this month.

Dell preps for the next step

Company needs to innovate, broaden offerings for large-enterprise market.

■ **BY PHIL HOCHMUTH**

AUSTIN, TEXAS — This is the year Dell needs to decide what its PowerConnect switch business will be when it grows up, observers say.

In the almost two years since Dell entered the network hardware market, it has gained some fans among small and midsize companies — especially those looking for a one-stop-shop approach for all infrastructure, from PCs to servers and networks. But some say unless Dell develops its operation — with offerings such as Layer 3 switch chassis, or security or VPNs — it will never be a serious threat to Cisco in the large-enterprise market — as many expected Dell would be.

"Overall we're very pleased with the feedback from our customers and our position in the networking market, since entering the business a year and a half ago," says Ulrich Hansen, senior manager for product marketing for Dell's PowerConnect line of switches.

Since the first three PowerConnect products started shipping in the fall of 2001, the company has expanded its portfolio to nine switches, including Gigabit Ethernet and high-density stackable offerings. Dell also has grown its distribution, from an initial focus on North America to the recent move to Asian, European and South American markets.

The company says the next step will be the enterprise core. Hansen says Dell will have a modular Layer 3 switch out later this year. The product will be aimed at customers who have deployed Dell on the LAN edge and who want to integrate the company's products deeper into their networks.

With the products it has now, Dell has gained a foothold in companies that use basic Layer 2 switching with some Layer 3 services, such as quality-of-service support and packet filtering.

Low cost, simple management and consolidated support were the key selling points for Dell's network gear when it was installed at Colliers International, a real estate conglomerate in Austin.

"All of our servers, PCs and laptops are from Dell," says David Bobzien, a regional technical manager who supports the LAN equipment in Colliers' 60 North American offices. "That leaves me with one number to call for any support issues."

Bobzien says the equipment is reliable, and easy to manage and support remotely, which is crucial for his deployment.

On the defensive

Despite the hoopla of Dell's entry into the LAN market — which resulted in 3Com and Cisco ending partnership agreements with Dell last fall — the company has not greatly influenced the market so far, analysts say. The 1.5% market share in the Layer 2 and Layer 3 stackable market (see chart, page 22) the company holds lags far behind the competition it seeks to unseat.

Even though Dell lacks market share, the company has gotten the attention of its biggest competitors.

Last December, Cisco's CEO John Chambers said Dell is part of a "generation of competitors is attacking us from below," and added that "companies that attack from below cannot compete on a medium to high level."

Additionally, he said, "We will strengthen our relationship with IBM and HP-Compaq to face Dell in its own sector. It will be interesting to compete with them."

Part of Cisco's strategy emerged this week, as the company announced its Growing with Technology Solutions practice for small and midsize businesses. The combined product/services offering will involve Cisco network gear along with IBM servers and PC hardware, and includes consulting and integration services from IBM and Cisco.

3Com is another vendor with a piece of the stackable switch market share that Dell

See Dell, page 22

P&G outsourcing deal to put HP 'on the map'

■ **BY JENNIFER MEARS**

Procter & Gamble knows consumer products — everything from diapers to toothpaste to potato chips. Networks, data centers and help desks fall somewhere down on the company's list.

Not that IT isn't important to P&G.

"We just looked at all the things that we're trying to do with our IT organization and shared services organization, and we felt tapping into an external partnership would give us greater access to IT innovation," says Damon Jones, spokesman for the Cincinnati company.

Like many companies these days, P&G has looked to outsource its IT infrastructure and services to reduce costs and benefit from the expertise and innovation the consumer goods company likely couldn't provide on its own. Last week, the company announced that it was in final negotiations with HP for a managed services contract that would be the biggest in HP's history.

Experts say the deal marks a shift in the outsourcing market, which IBM and Electronic Data Systems (EDS) have dominated, analysts say. According to Gartner's latest figures, IBM leads the IT management

See HP, page 22

Serving it up

HP is raising its profile in the outsourcing market. It has three big deals that are in final negotiations:

Procter & Gamble

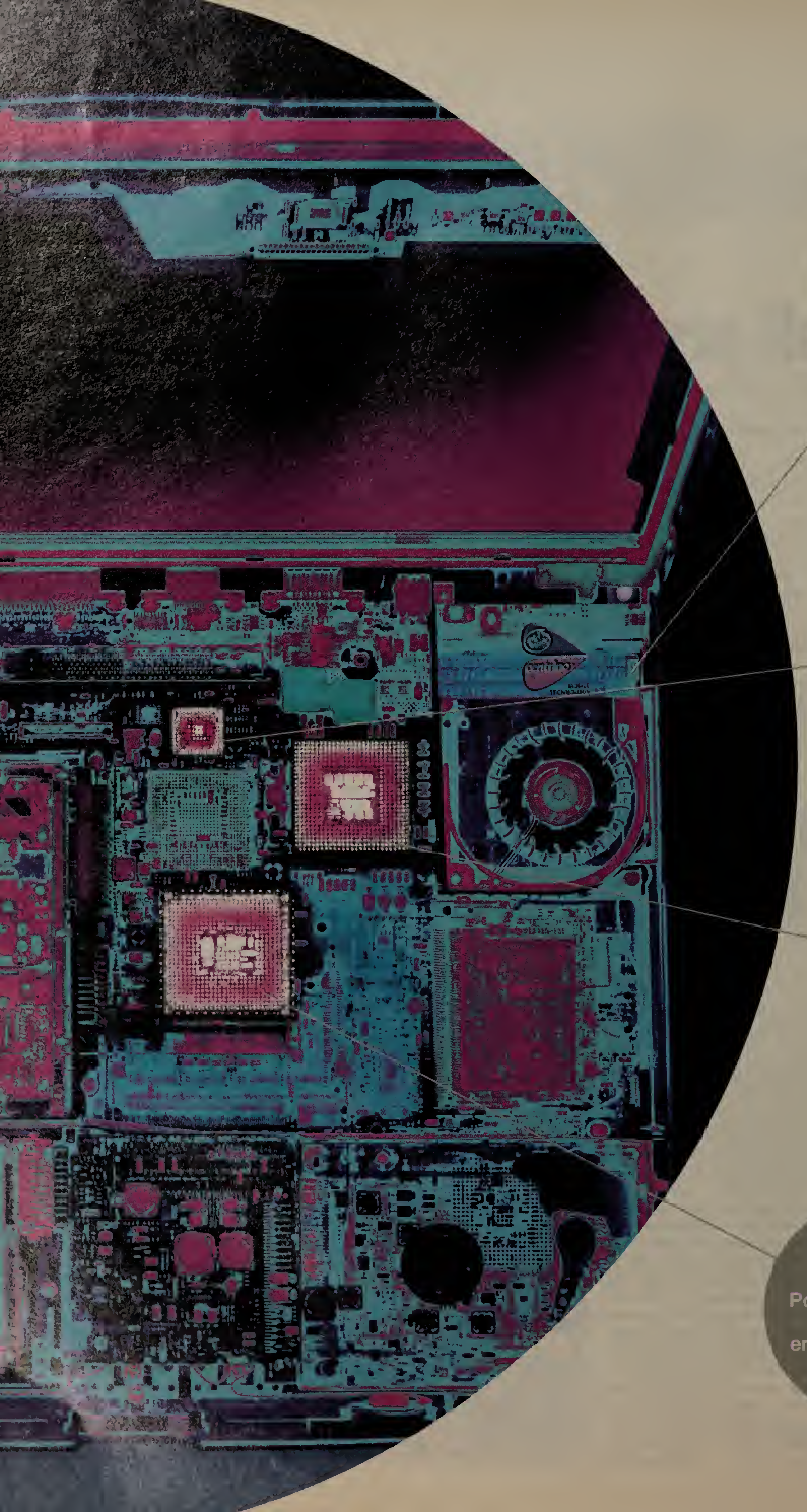
Agreement in principle to a $3 billion, 10-year deal to manage P&G's IT infrastructure, data center operations and networks, and provide desktop and end-user support, as well as some application development.

Ericsson

Memorandum of understanding to manage Ericsson's IT infrastructure, including mainframes and servers, and provide desktop and helpdesk support. Terms have not been disclosed.

Bank of Ireland

Negotiating a seven-year, $600 million deal to manage the bank's desktop environment, midrange servers, mainframes, networks, output and printing operations, and facilities.



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WIRED WINDOWS

Dave Kearns

A standard celebration

It might be clichéd to say that one of the best things about standards is that there are so many to choose from, but it's also still very sadly true.

Over the past five years, both in this column and in the Identity Management newsletter I write for Network World Fusion, I've often decried the proliferation of committees, organizations and ad hoc groups purporting to be the standards bearers for identity. I came down hard on Sun when it called the first meeting of what became the Liberty Alliance project to create a federated identity standard, seemingly as a knee-jerk reaction to Microsoft's announced plans for its Passport technology (see www.nwfusion.com, DocFinder: 5228).

Even after the Liberty group developed its first specification (and did it in record time, for a "standards body"), I still thought it would be best to have the effort at least blessed by one of the existing standards groups. Because Liberty's spec was based in large part on the Security Assertion Markup Language (SAML) developed by the Security Services Technical Committee at the Organization for the Advancement of Structured Information Standards, I felt that OASIS would be the right venue for federated identity work.

Therefore I'm very gratified to see that the Liberty Alliance has turned over the specification — called the Identity Federation Framework — to OASIS, where it will be used to help further the development of SAML. This, in turn, will be used to help create future specifications at Liberty.

Some have alleged that the Liberty move was a pre-emptive strike against IBM and Microsoft, which are seen to be championing a competing federated identity specification, but there is no reason to believe that the two standards — which actually take a different focus — will not interoperate. Both can use the SAML standard, both are based on the SOAP protocol and both are being shepherded through the standardization process by OASIS, now that Liberty has submitted its documents.

And while there are still two distinct OASIS technical committees working on the two standards, there also is another committee — whose members include IBM, Microsoft and Sun — that works to ensure cooperation and interoperability among the various OASIS groups that impinge on the security arena.

It looks like competing standards are beginning to coalesce into something that the industry can use, at least in the area of identity management, and that's worth celebrating.

Kearns, a former network administrator, is a freelance writer and consultant in Silicon Valley. He can be reached at wired@vquill.com.

Tip of the Week

The Liberty spec is two-pronged, incorporating both a technology framework and a business/legal framework. **Ping Identity,** is one of the few companies involved in both aspects. Check its Web site (www.pingidentity.com for details and working demos.

HP

continued from page 19

market with 14.4% market share, followed by EDS, which holds 10.6% of the market. HP, on the other hand, ranked seventh with a little more than 1% of the market.

"This is a huge win for HP," says Andy Efstathiou, program manager at The Yankee Group. "The size of the deal puts them on the map."

It's not that IT executives don't consider HP when it comes to outsourcing, it's just that the company has been better known for its servers and printers.

"The legacy companies [Compaq and HP] were primarily product-oriented," Efstathiou says.

"They thought, 'If we invent a better box, the world will be wonderful for us.' . . . But there has been a change in terms what people think of as the basis of competition in high technology. Services are playing a much higher profile," Efstathiou adds.

HP has focused on its services business, which doubled to be a $13 billion operation with more than 65,000 employees worldwide after the merger with Compaq last year.

A long road

HP still has a ways to go to catch up with market leaders EDS and IBM, though. EDS reported $21.5 billion in revenue last year and employs 137,000 people worldwide.

"Since the merger we've closed over 200 managed services deals," says Juergen Rottler, vice president of marketing, strategy and alliances for HP Services. "HP is now clearly established as a Tier-1 player and as the one viable alternative to IBM. We believe that IBM is beatable."

Customers are beginning to think so, too. P&G considered IBM and EDS before settling into final negotiations with HP. A definitive agreement, which includes the transition of about 1,850 P&G employees from 50 countries into HP Services, is expected in May.

Ericsson also is close to a deal with HP to have the company manage its IT infrastructure. Ericsson announced last week that it had signed a memorandum of understanding with HP. The deal is expected to be finalized by the end of the second quarter, says Eva Sparr, director of Ericsson corporate communications.

Sparr wouldn't say what companies the mobile communications company considered in addition to HP, only that "there have been other negotiations."

Cost concerns

Cost was a key concern because the outsourcing deal is part of Ericsson's efforts to cut costs across the business, Sparr says. Flexibility was another issue.

"When there are changes in the industry and in our operations we want to be flexible both in terms of costs, but also when it come to the kind of scales that we need. . . . HP was the best when it came to meeting our requirements," she says.

HP's Rottler says the ability to adapt to a customer's changing needs are a priority for HP in its outsourcing deals. The deals make use of utility computing that will ensure that customers only pay for the resources they need, he says.

> **"Since the merger we've closed over 200 managed services deals."**
>
> **Juergen Rottler**
> Vice president of marketing, strategy and alliances, HP Services.

Utility computing has been a focus for hardware vendors such as HP, IBM and Sun and is part of IBM's e-Business On-Demand initiative.

"A large outsourcing arrangement becomes the ultimate utility," Rottler says.

Customer are looking for a contract and a relationship with an outsourcer that can "bend and flex with changing business needs." ■

Dell

continued from page 19

covets. And the original Ethernet company is also taking Dell's presence seriously. "There is a place for [Dell in this market]," said CEO Bruce Claflin in a recent interview with *Network World* editors. "Their biggest risk is trying to go too far outside their business model. I respect them as a competitor."

Ready for the next step?

Some industry watchers say Dell will have to greatly expand its network portfolio or partner with other vendors to provide a more complete enterprise infrastructure menu. Price cannot always be the company's secret weapon when going after larger customers.

"With Dell, everything has been aligned with total cost of ownership and price, which always gets a fair amount of attention," says Chris Kozup, an analyst with Meta Group.

"Large enterprises also are concerned with a vendor's ability to innovate on platforms and expand into new areas, such as voice-over-IP wireless or security. Many large enterprises would rather have their network provider be ahead of the curve instead of just responding to standards as they evolve," he says.

Kozup says much of Dell's success has been with its PC and server customer base. Larger customers that prefer uniformity from the LAN edge to the core will be tougher nuts to crack.

"I have never even glanced at Dell's networking offerings," says Eric Mucci, head of IT at Beiersdorf USA, a manufacturer of skincare products in Norwalk, Conn. "They are a computer company, not a networking company.

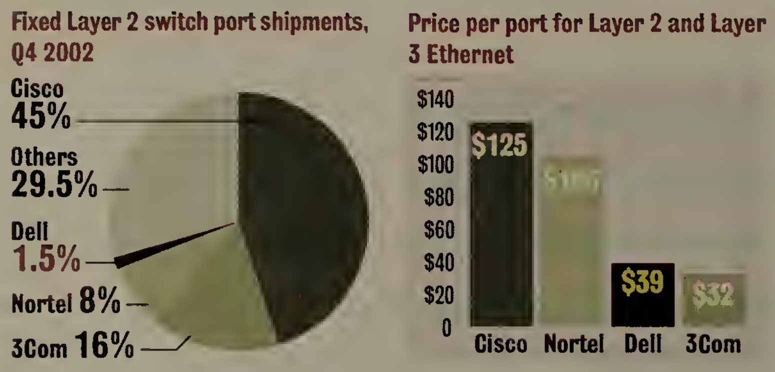
Beiersdorf uses Cisco stackable and Layer 3 chassis products in its LAN.

Mucci says integrating Dell or any other third-party equipment into his infrastructure would negate the added features an all-Cisco network provides, such as improved management and a single repository of spare parts, such as power supplies, add-on cards and other equipment.

"To introduce an additional brand of gear into a Cisco shop would likely remove much of the initial cost savings," he says. ■

Keep hammering

As the PC and server maker branches into other corporate areas, observers say Dell must continue to use price to beat its more established competitors.



Fixed Layer 2 switch port shipments, Q4 2002

Price per port for Layer 2 and Layer 3 Ethernet

SOURCE SYNERGY RESEARCH GROUP

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What challenges do you face today? Decreasing budgets? The lurking possibility of downtime? It's hard enough to focus on moving your business forward when you're constantly looking over your shoulder to see if everything is up and running.

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At the end of the day, you'll have more control over your infrastructure, help avoid unplanned downtime and reduce overall maintenance costs. Not to mention freeing yourself up for more important things.

To learn how HP ProLiant servers can be a part of maximizing your company's uptime, download CMP's executive brief on high availability at www.hp.com/go/proliant92 or call 1-800-282-6672, option 5, and mention code YPQ.

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Promotional Report

Analyst Report

Top Analyst IDC Concludes that New Breed of VPN Delivers Significant Return on Investment

March 31, 2003

IDC **Analysts** – Steven Harris, Courtney Munroe, and Morris Edwards

In your business today, every application is mission critical. If your network goes down, your applications are useless and your business suffers. In this environment, an increasing number of enterprises are searching for ways to deliver applications to their customers, partners, suppliers, and their own offices through high performance yet cost effective data networks. For many businesses, Virtual Private Networks (VPNs) have emerged as an effective strategy for meeting today's performance and cost requirements. IDC evaluated a number of VPN implementations and found that a new breed of VPN results in a significant return on investment (ROI) because it reduces cost, increases user and IT productivity, and saves revenue by reducing downtime.

Choosing a VPN Strategy. Historically, VPNs used the public Internet as their network backbone. With Internet VPNs, powerful (yet complex and unreliable) routers were installed in the customer's premises and virtual private connections were carved out of the public Internet using secure "tunnels." Alternatively, if you were concerned about the reliability and performance of the Internet, you could implement a private frame relay network, but costs go up and flexibility and scalability are decreased, making it difficult to build and manage as you grow. Today, a new breed of VPN is available that uses a private network backbone and network-based virtual services to deliver the performance, reliability, and security demanded by mission critical applications at a lower cost than frame relay or Internet VPNs.

Table 1: ROI Analysis

Item	Three-Year ROI	Payback Period
All Companies Surveyed	639%	211 days
Companies with prior Frame relay network	544%	201 days
Companies with prior Internet-based network	707%	226 days

Source: IDC, 2003

Once you have decided to include IP VPNs in your network strategy, you have to choose whether to build and manage your own VPN or outsource to a managed service provider. Building a private IP VPN network in-house is a capital-intensive undertaking requiring expensive equipment, engineering expertise, purchasing and contract negotiation skills, and ongoing management and support for all site locations. Using a managed service provider means you can "plug into" a proven network with significantly lower up-front expenses and leverage the people, processes, and management tools of the service provider to build your network and guarantee its performance and availability.

IP VPNs Mature from "Best Effort" to "Business Class". Traditional Internet-based VPNs or frame relay networks do not provide QoS guarantees, forcing enterprises to provision separate circuits for each advanced application and adding to the cost and complexity of their network. MPLS (Multiprotocol Label Switching) is being tested by a few service providers and offers some promise by allowing applications to be "tagged" to receive priority service on a circuit. However, MPLS is not yet able to guarantee bandwidth across the network for different traffic flows, thereby rendering it useless in providing site-to-site QoS and SLAs – priorities are established, but not guaranteed.

One managed service provider that offers enterprises a business-class IP VPN service is Savvis, whose Intelligent IP Networking℠ platform hosts and delivers mission critical applications in 45 countries with high performance, reliability, and security through a variety of intranet, extranet and Internet options. Savvis designs and implements each customer VPN and provides end-to-end management. They offer five QoS levels, which customers can specify for each application, guarantee 100% availability, and include monitoring and reporting. Also, unlike other service providers, whose SLAs are limited to their own backbone or to the edge of the next provider's network, Savvis offers end-to-end SLAs for its IP VPN service.

Return on Investment. To validate the business benefits of this new breed of VPN and to determine the return on investment (ROI), IDC interviewed a number of Savvis enterprise customers, and asked a series of questions on costs, revenues, and specific IT processes, including associated time and staffing requirements before and after deploying a Savvis managed IP VPN.

The ROI results were based on demonstrated cost savings, reduced downtime, increased user and IT productivity, and additional revenue generation made possible by the Savvis solution. Almost 80% of the companies surveyed said their Savvis solution gave them a competitive edge, mainly because of the increased reach, speed, and ease of adding new sites.

Over a three-year period, the surveyed companies achieved an average ROI of 639%, with an average payback period of 211 days (see Table 1). Enterprises with a prior frame relay network achieved an average three-year ROI of 544% with an average payback period of 201 days. Customers switching from an Internet-based network provider to the Savvis solution achieved an average three-year ROI of 707% with an average payback period of 226 days.

Conclusion. Based on its analysis, IDC believes that some IP VPNs are maturing from "best effort" networks to "business-class" enterprise solutions. Savvis' managed IP VPNs are a leading example of this new breed of VPN and offer significant performance, reliability, and cost advantages to businesses with mission critical IP applications.

These quotes were drawn from case studies done by IDC.

"With Savvis, we got a more robust and reliable network for a lower cost. It's basically a 300% improvement in performance at 50% of the cost. The reduction in network outages, since going with Savvis, has definitely caused an increase in customer confidence in our company and in our solutions."

Bob Newman
Director of Networking
AdPlex Rhodes

"There are other law firms that don't have this type of service. They aren't as responsive to the customer/clients. So we feel that this gives us a little bit of an edge. It gives us the opportunity to communicate with more people. We liked the idea that Savvis could provide different services in an integrated fashion. We liked that we could use them for Internet access, intranet, and remote access without having separate networks or separate providers."

Stephen Koenig
MIS Manager
Walsh, Anderson, Brown, Schulze & Aldridge, P.C

"We don't have any downtime. We've been with Savvis a year and three months, and I don't know that we've ever had an outage that has affected our customers. But it's not just high availability that has made Savvis stand out as a superior service provider. They bill it as a managed service, and that's what it truly is. Savvis is the only one that can effectively do everything that we want. We don't want to do any work. Savvis does just about all of it. That's what we view as being managed."

Mike Lapenna
CIO
CollectiveBid

Download the full IDC whitepaper at www.nwfusion.com/idc/savvis/vpn

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IBM refines app upkeep services

BY ANN BEDNARZ

Legacy application maintenance is an ongoing, complex chore that consumes IT resources at a remarkable — and seemingly unabated — pace.

IBM this month announced two new services aimed at helping customers devise long-term plans for maintaining their legacy applications. Its goal is to help customers integrate proprietary systems that grew over the past two decades with open-standards-based technologies such as Web services, says Kerrie Holley, distinguished engineer at IBM Global Services.

The packages are intended to help companies that once planned to slowly phase out old mainframe applications in favor of packaged business software but now realize they can't afford to replace their older workhorses in today's era of modest IT budget growth.

Nor can businesses afford to neglect these legacy systems, which they rely on to run their daily operations. Mainframe applications written in COBOL process 30 billion transactions per day — as much as 70% of the world's business data, Aberdeen Group estimates.

The problem is, maintaining these systems represents a huge fixed cost for most companies. Aberdeen Group says companies spend 80% of their application-related IT costs maintaining legacy software. Complicating things is the age of legacy applications — many date back more than 20 years — and years of staff turnovers and scores of undocumented software tweaks.

In the past, many companies tackled system upgrades in a stopgap manner, expecting to soon retire the old applications. Common tactics involved screen-scraping and code-generating tools that translated data from legacy systems into formats such as XML or Java to create new, Web-compatible front-end programs.

But tackling modernization projects piecemeal can create more complexity and compound what users call "spaghetti code" conditions, says Stephen Lane, research vice president at Aberdeen Group. "Every time someone adds a new feature or Web-enables something, even though the developer may try to minimize the impact on the legacy code — using XML wrappers, for example — it's quite likely that it's adding more spaghetti to what's already there," he says.

An outsourcing agreement, such as the one Canada Life brokered with IBM, is one way to deal with legacy maintenance. The Toronto insurer is outsourcing care of its Genelco insurance claims and administration applications system to IBM in an arrangement whereby Canada Life pays for IT services based on the number of insurance policies it processes.

The deal, inked last month, frees the insurer's IT staff to focus on business enhancements rather than day-to-day application maintenance and infrastructure support, says Doron Cohen, senior vice president and CIO at Canada Life. "I want to get out of managing technology. I want to manage business processes. That's the key driver," Cohen says.

Outsourcing its application work should help Canada Life roll out new customer features faster, because the deal calls for IBM to adhere to a regular schedule of

See IBM, page 26

Mainframe challenges

Legacy applications can be difficult to use in new ways without unpredictable results, according to Aberdeen Group. The research firm identifies these six common problems:

- Inadequate flexibility to support new processes and products.
- Costly and time-consuming incremental changes.
- Inability to share features and data with other applications.
- Incompatibility with Web technologies.
- Difficulty in providing information access to constituencies.
- Inability to reuse code to create common shared services.

Short Takes

■ **Siebel Systems** last week rolled out Version 2.0 of its **Universal Application Network,** adding 50 new industry-focused applications to the 50 that already exist for the integration system. UAN offers tailored business-process packages that work in conjunction with integration servers from vendors such as IBM, SeeBeyond Technology and webMethods. Among the industries targeted in the UAN update are automotive, communication, energy, financial services, insurance, healthcare, high-technology and manufacturing. The new integration applications cover processes such as managing billing, assets, inventory, claims processing and customer service. Pricing for UAN varies widely depending on a customer's needs and the number of modules deployed.

■ **Oracle** is preparing a **supply-chain management suite module** tailored for the aviation and defense industries. Oracle Complex Maintenance, Repair and Overhaul, slated for a mid-May release, is intended to offer organizations real-time process information drawn from a number of operational divisions. MRO can aid in such activities as component life-cycle tracking, fleet- and unit-focused maintenance planning and scheduling, inventory management, regulatory documentation and data storage, according to Oracle. The Web-based application, built atop a database, will be sold to airlines, maintenance companies, armed forces and government contractors. Pricing depends on configuration. SAP AG also offers an MRO application, but breaking into the aerospace and defense market has been tough for such suite-focused vendors because of their tight integration with their own back-end infrastructures, according to a research note from AMR Research.

Sonic Software revs up application integration

BY JOHN FONTANA

BEDFORD, MASS. — Sonic Software next week will release a new version of its application integration software and a suite of products designed to let corporations connect disparate systems and tie them into a business-process workflow.

The company's Sonic ESB 5.0 is a platform that uses XML and Web services, routing, reliable message transport, data transformation and management, and monitoring to let disparate applications talk to one another. ESB stands for Enterprise Service Bus, a sort of grid that numerous applications can plug into regardless of the protocols, formats or platforms they use.

Observers say ESBs are a threat to traditional enterprise application integration because ESBs are lower in cost and more flexible. They also are a threat to application servers, which create a hub-and-spoke architecture that can become a bottleneck and single point of failure.

"Basically this is the next step beyond application servers, which were the next step beyond separate transaction processing and messaging systems between each pair of applications," says Dennis Byron, an analyst with IDC. He says the challenge for Sonic's parent company, Progress Software, now that it has competent ESB software, will be winning deals against bigger vendors such as IBM.

Along with ESB 5.0, Sonic also unveiled its Business Integration Suite, which includes ESB 5.0 and servers to manage workflows and process XML messages, development tools for building integration projects, and adapters for connecting prepackaged applications, mainframes and legacy data systems.

"We say ESB is next-generation enterprise application integration," says Jon Johnson, chief engineer for Command, Control and Intelligence at Northrop Grumman Mission Systems in Colorado Springs. "With ESB you get much more out of the box. We get capabilities that we previously had to build and maintain

See Sonic, page 26

'NET INSIDER

Scott Bradner

Building the new on the bones of the old

This is a belated commentary on a short *Fortune* magazine article from January about a Bell Canada technology trial of turning old pay phones into Wi-Fi access points. Definitely, a "duh" moment. Boy does that idea make sense. Well, maybe it makes sense, but it sure should.

The idea is to swap out those mostly-idle-because-everyone-has-a-cell-phone public pay phones for Wi-Fi access points and give folks loitering nearby a chance to get online. So far, the Bell Canada trial is offering free Internet access through the converted pay phones, but I expect that will not last. Bell Canada is a phone company after all, and someone has to pay for the swap.

This idea has almost everything going for it. (I wonder how many patent applications already have been filed on this idea.) Bell Canada has the locations and permission to use them for communications. Pay phones are in all the best places (and quite a few of the worst). The locations have phone lines that can be used to support DSL for reasonable-speed Internet access. You can even do DSL link sharing and keep the phone (to support people who forget to charge their cell phones). Some of them already will have power.

Bell Canada's Web page on the trial (www.bell.ca/accesszone) shows a quite-neat-looking access point called a "hot spot box" that is protected by a transparent plastic shield. I cannot tell from the picture how big the thing is, but it looks like it might resist the attentions of vandals — up to a point.

About the only thing wrong with the idea is that the phones belong to a telephone company. Bell Canada seems somewhat cluefull when it comes to data networking in general (it has worked with the research data networks in Canada for years), but it remains to be seen if that translates to being cluefull enough for this type of network. Imagine, if you will, your local baby Bell (sheesh, those babies are getting big — and some of them are going broke in a big way) trying to install, price and run such a service.

And what happens when people start getting mobile phones with Wi-Fi interfaces and voice-over-IP (VoIP) support? Or, when people start using VoIP stacks that are in most laptops? You can bet that the phone companies suddenly will realize that they are offering a service where a main use is telephone company bypass. Things could get a bit funky when that happens; maybe the carriers will try to pull a Panama and attempt to block the VoIP applications (see www.nwfusion.com, DocFinder: 5533).

The basic idea should be a real good one. The instant, well almost instant, ability to deploy Wi-Fi to many hundreds of thousands of places, with most if not all the infrastructure existing. There is just this nagging worry about the clue density of the owners.

Disclaimer: *U.S. News & World Report* that was just published implied good things about clue density at Harvard, but the above reflects my own — not the university's.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

IBM

continued from page 25

application upgrades and implement code changes the insurer specifies within a predetermined time period, Cohen says.

Outsourcing is not the only answer.

Big Blue's two new services offerings are Application Portfolio Management Services, which calls for IBM consultants to evaluate an organization's legacy systems and make recommendations on which applications to keep, abandon or change; and Legacy Transformation Services, wherein technical professionals renovate, integrate, migrate and place legacy applications on the Web.

Legacy modernization services such as application migration and Web enablement are not new concepts, Lane says. What's significant is that IBM has "drawn a road map showing how what once might have been considered discrete types of initiatives could be turned more into a strategic plan," Lane says.

IBM is advocating an incremental approach to mainframe modernization, so that as companies complete each phase of redevelopment they are laying the groundwork for the next step, Lane says. For example, consider an airline that wants to provide customers with online access to frequent-flier account information stored on a mainframe. The airline could build a Web front-end system by wrapping mainframe data in XML. In the short term, Web-enabling the application yields benefits: Customers appreciate the convenience of the service, and the airline can reduce its call-center volume by diverting queries online, Lane says.

Alternatively, the airline could decide to go the extra mile and make the mainframe functionality available in a shared services environment where different pieces of the legacy environment — for example, a component that handles customer name validation — are reusable and available to other systems.

Going the shared-services route expands a company's options, Lane says. "Definitely in the long run it's going to be a much more flexible environment," he says. "It's going to enable companies to do significantly greater levels of business transformation." ■

Sonic

continued from page 25

ourselves."

Johnson uses ESB to tie together about 20 systems that were never meant to talk, such as search-and-rescue applications and weather programs that the military uses.

"ESB uses native data formats, which means I don't have to parse as much data, and that means I can move it faster," Johnson says. ESB is the foundation of Northrop's Command and Control Interoperable, Collaborative Enterprise platform, which it uses to provide integration services to its military customers.

The competition

ESB, which competes with products from vendors such as BEA Systems, IBM, SeeBeyond and Tibco, consists of a distributed set of Communication Servers, or message brokers, and Sonic Service Containers, which are the application endpoints. Version 5.0 has a new management package built on Java Management Extensions, which lets users set limits on things such as traffic thresholds. Sonic also has added a set of configuration templates that let changes be pushed out in mass to Sonic's Service Containers. And the company added security features that support Java Authentication and Authorization Service, and integration with directories based on Lightweight Directory Access Protocol.

ESB 5.0 also is integrated with Sonic Stylus Studio, a visual tool for creating XML data transformations. The tool set also includes a Business Process Management engine.

In addition, ESB 5.0 is part of Sonic's Business Integration Suite that also includes Orchestration Server, for tying applications into a business workflow. The suite also includes two tools from Sonic's acquisition of eXcelon last year: XML Server, which can store XML messages to create an audit trail; and Integration Studio, a visual development tool based on Stylus Studio. Sonic also is including a set of adapters licensed from iWay.

ESB 5.0 is priced at $10,000 per CPU. The Orchestration Server is priced at $12,500 per CPU, and the XML Server costs $10,000 per CPU for the standard edition and $40,000 for the enterprise edition, which includes features such as distributed caching. Both will ship this fall. ■

Toolmaker extends mainframe apps

One of IBM's partners and tool suppliers, Relativity Technologies, this week is launching a product suite aimed at helping companies maintain and modernize their legacy COBOL applications.

The vendor's new Modernization Workbench suite, formerly called RescueWare, is a set of tools designed to help reduce application complexity and extend mainframe applications to Web environments.

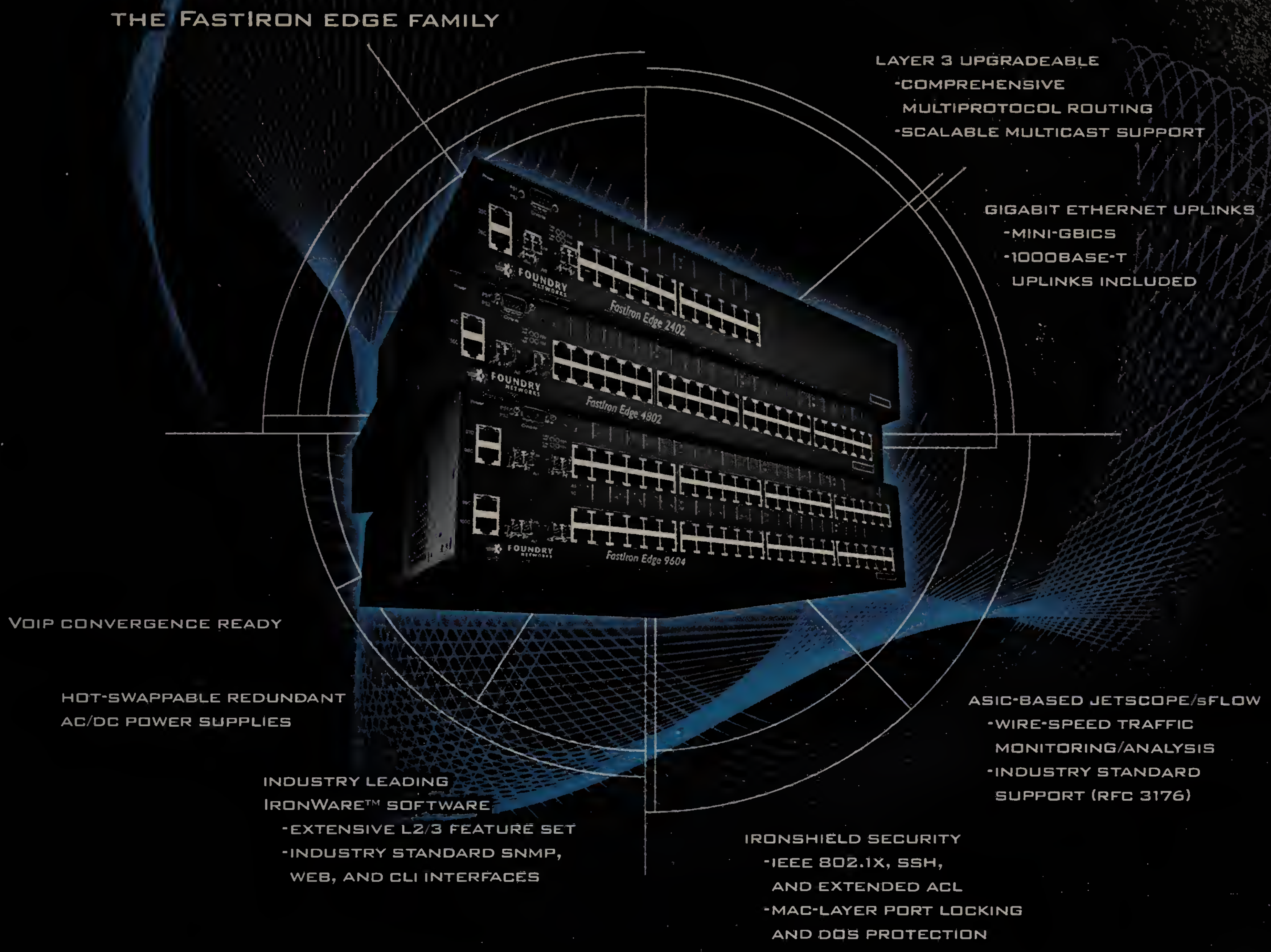
Whereas Relativity's original RescueWare product line was focused on converting legacy code to Java or Visual Basic, the renamed and expanded Modernization Workbench suite extends the company's focus across three stages of mainframe application evolution — maintenance and enhancement, renovation, and modernization — says Charles Dickerson, vice president of marketing at Relativity.

The suite includes four modules:

- Application Analyzer, which extracts information from application source code into a repository of assets. It's used to document legacy applications, and perform system and source code analysis. For example, a developer could quickly model the effect that changing a variable type or key field length in one application would have on other existing systems.
- Application Architect, which helps partition unstructured COBOL code into new, reusable components, organized by user interface, business logic and data access layers, for example. It also identifies obsolete code that is never referenced or can no longer be executed.
- Business Rule Manager, which looks for business rules locked in source code, and then documents and classifies the rules so developers can better understand legacy applications.
- Transformation Assistant, which automates the process of migrating legacy applications to new platforms without losing features.

Modernization Workbench runs on Windows 2000 and NT. Pricing ranges from $50,000 to $200,000 for packages that include software licenses, training and preloading of a customer's application into Relativity's repository.

— Ann Bednarz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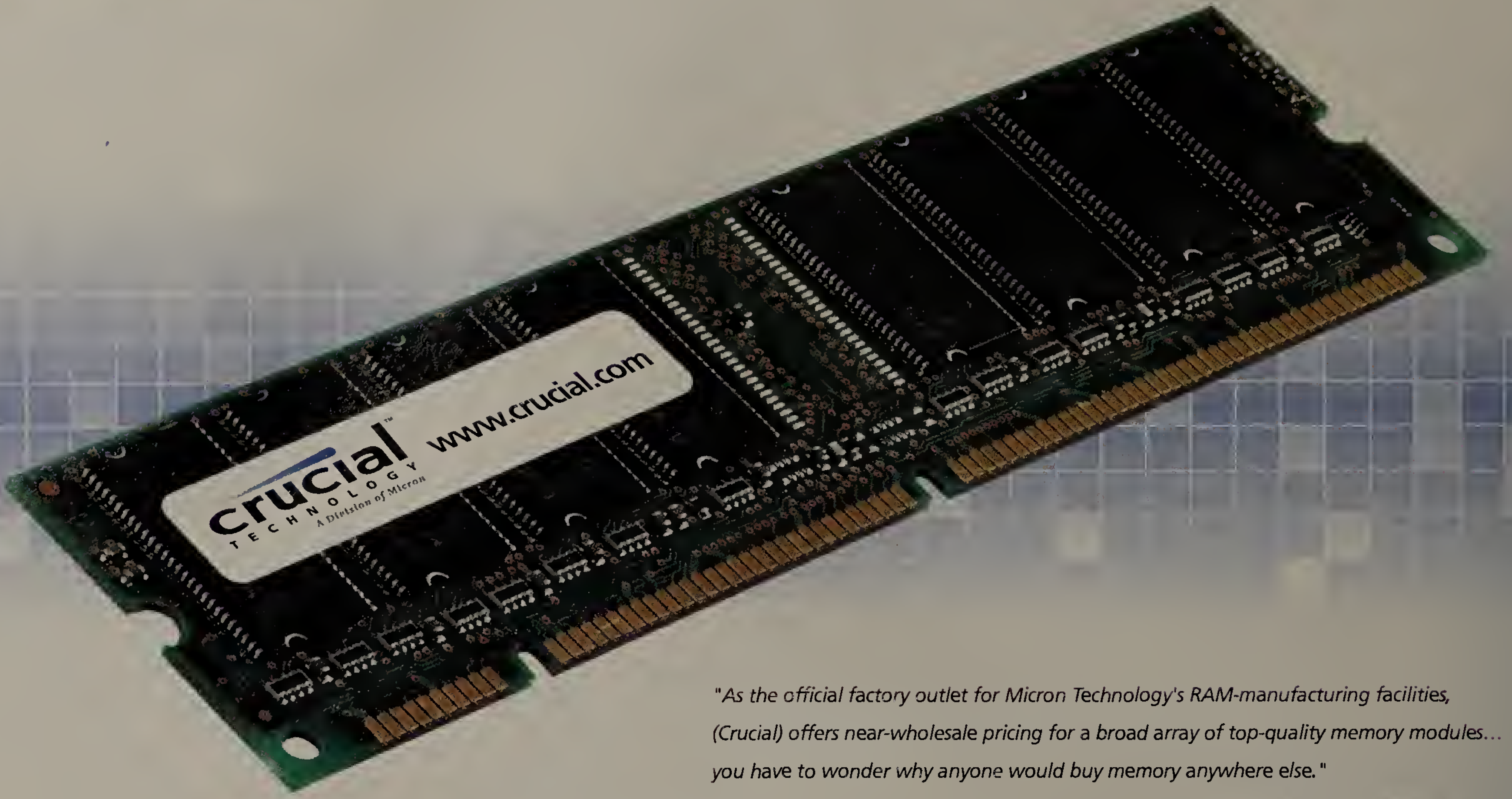

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INCORPORATING The Edge

Short Takes

Marconi and **Riverstone Networks** recently announced a partnership to combine their products into metropolitan Ethernet systems for carriers. The companies will jointly market Riverstone's metropolitan IP routers with Marconi's multiservice switch-routers, optical transport gear, broadband access systems and softswitches. The companies initially will target carriers in Europe, the Middle East and Africa, but as demand for packet-voice products increases, the partnership will expand to include carriers around the world, the companies say. Marconi will provide service and support to joint customers. Marconi and Riverstone recently provided Jersey Telecom, a U.K. telecom provider, with a converged voice, video and data network. Jersey Telecom is rolling out a suite of commercial and residential broadband services based on the Riverstone/Marconi system, such as voice and multimedia, across TV set-top boxes, PCs and PDAs.

Managed hosting provider **Digex** is unveiling a slew of services that it says are designed to better meet the needs of business customers that are putting critical applications on the Web. The new services are **Hosted Siebel, Hosted PeopleSoft, Digex AppSpect and Digex LAN-Extender.** The hosted application services include automated monitoring and pre- and post-production services. Digex AppSpect services test hosted applications for the most common application security vulnerabilities. The service, which costs $5,000 per test, includes consultation with Digex security experts who make recommendations for improving application security. Digex LAN-Extender lets customers securely hook in to Digex data centers, enabling remote data replication, remote disaster recovery and single sign-on across legacy and hosted applications. Enterprise Hosting services come with flexible service-level agreements, Digex says.

Netli looks to cut 'Net delay

Service provider uses proprietary protocol that it says is faster than TCP.

BY TIM GREENE

PALO ALTO — Start-up service provider Netli promises to improve the Internet speeds of corporate Web applications without making changes to the applications and without adding software to the remote computers making Web connections.

Called NetLightning, the service reduces the delay that Internet traffic suffers when it crosses long distances.

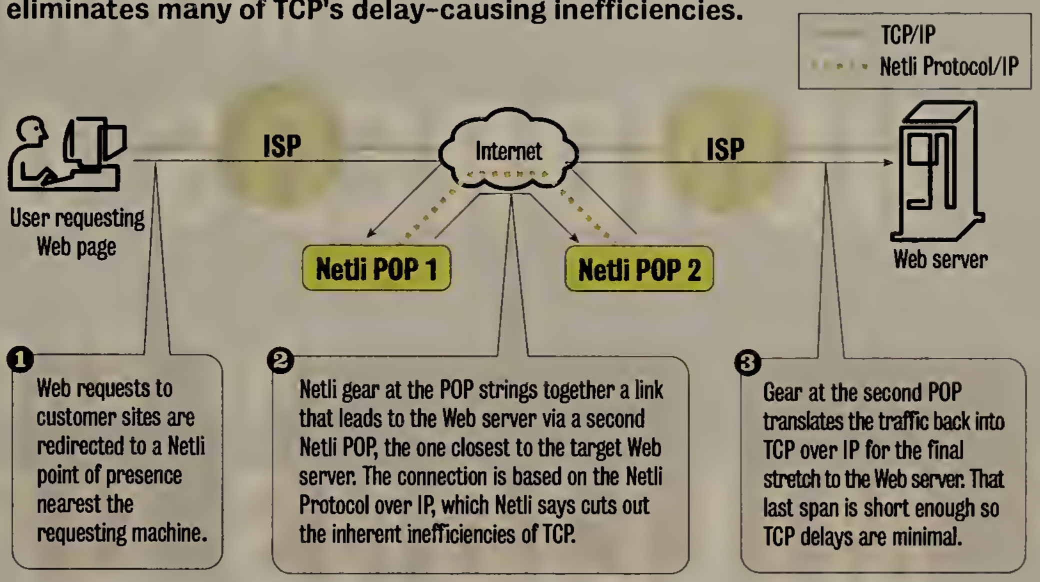
This reduction is important with e-commerce pages in which potential customers leave a site if it takes too long to reach the resources they want. Netli says it pushes Internet delay below 1 second regardless of where Web servers and the computers accessing them are located.

Medical equipment vendor Millipore

See Netli, page 32

Speeding up TCP

Service provider Netli takes the wait out of long-distance Internet hops by using The Netli Protocol, a proprietary alternative to TCP that Netli claims eliminates many of TCP's delay-causing inefficiencies.



❶ Web requests to customer sites are redirected to a Netli point of presence nearest the requesting machine.

❷ Netli gear at the POP strings together a link that leads to the Web server via a second Netli POP, the one closest to the target Web server. The connection is based on the Netli Protocol over IP, which Netli says cuts out the inherent inefficiencies of TCP.

❸ Gear at the second POP translates the traffic back into TCP over IP for the final stretch to the Web server. That last span is short enough so TCP delays are minimal.

Q&A

Rackspace angles for bigger fish

Although the hosting market has experienced many bankruptcies, Rackspace Managed Hosting says it has been profitable for two years. The San Antonio, Texas company last year began focusing on larger businesses with its Intensive Hosting, a fully managed package. Network World *Senior Writer Jennifer Mears recently spoke with Rackspace CEO Graham Weston.*

As competitors have folded or scaled back, Rackspace has been growing. Why have you been able to weather the storm?

We've grown our business through referral, and the way you get referrals is by doing a good job for your customers and having customers who want to tell their friends about you. We did that through fanatical support. We really built our business not as a technology business, but rather as a service business.

Rackspace initially was focused on smaller clients, right?

We started out as a Linux company and today over half of our business is Microsoft. We still are the No. 1 hoster on the Linux platform, but we're also No. 3 on Microsoft. We were focused on the small to [midsize] enterprise when we started. But today, the competitors at the high end have been falling like flies and [customers] have been attracted to us like honey.

How did you decide to target larger companies, and how are you making sure they know who you are?

[The launch of] Intensive Hosting was our decision to formally target the enterprise customer with a proactively managed offering, and it was directly competing with the low end of IBM and squarely at the Digex space. While Rackspace is not a household name, what has really paid off for us is the word of mouth. We built the whole company around serving customers, and we don't try to be all things to all people. And when you have the force of the customer on your side, you don't have to be a household name to have great growth.

Intensive Hosting is strictly offered for Microsoft running on Dell hardware. Does that limit your ability to attract clients? Are they looking for more flexibility?

When you decide to focus, you gain power in the area where you're focusing. There is such amazing growth taking place at the high end on the Microsoft platform that we decided to formally launch an offering that was specifically Microsoft and that was specifically targeted at enterprises. We

See Rackspace, page 32

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EYE ON THE CARRIERS

Johna Till Johnson

Researchers need room to breathe

About a year ago, an editorial in *The Wall Street Journal* caught my eye with a comment about "the Internet and other great technologies created by the free market." Now I've worked in private industry virtually all my life, and I'm as big a fan of the free market as anyone ... but the author was wrong.

The free market did not create the Internet. It was funded from its inception in 1969 through the early 1990s by a variety of government agencies and grants. Most notable among them was the National Science Foundation, which paid for not only the research and development but also the actual operation of the NSF backbone (to the tune of $10 million per year).

For that reason, the Internet was off limits to commercial use: As a particle physics grad student in the 1980s, I remember signing an acceptable-use policy in which I promised not to transmit commercial traffic across the 'Net. Private industries were involved (MCI, Sprint, and Bolt Beranek and Newman, among them), but most individuals who worked on Internet-related technologies until about 1990 were paid with government research dollars.

Why does it matter? It matters because I don't see any organization — whether government or private business — pouring that much money into pure research anymore. A few exceptions: IBM (which continues to heavily fund its TJ Watson Labs), Microsoft and some of the larger service provider research labs, notably AT&T and Verizon. But even in those examples, when you dig into the specifics, you'll find that researchers are encouraged to work on targeted research — solving the immediate problems of this year or next year, rather than building the underpinnings for technology innovation over the next decade.

Again, why does it matter?

Because the process of developing anything new, such as transformational technology, requires respite from the hurly-burly work-a-day world. You need the freedom to focus on what works, not what will make money. The only entities able to provide this freedom are the government and large, relatively stable companies.

Now you're probably thinking, "What about all the start-ups that keep coming up with great technology?" Think about it: Most start-ups created their great technology somewhere else, then built a company to capitalize on it. That means some other company unwittingly footed the bill for the creation of a potentially competitive firm.

That doesn't make sense. It's far better for a company to explicitly fund long-term research then retain a stake in its development and exploitation. IBM does this best right now. In my last column I mentioned that intellectual property creation was one of the great underutilized strengths of the service providers. Ma Bell could take a cue from Big Blue.

On a separate note, kudos to Bruce Tolley at Cisco for reminding me that the Internet Engineering Task Force is not the only standards body driving network technology, as Scott Bradner and I agreed in a previous column. The IEEE developed not only the original Ethernet, but also the wireless and Gigabit Ethernet specs that currently drive the market.

Johnson is president and chief research officer at Nemertes Research, an independent technology research firm. She can be reached at johna@nemertes.com.

Netli

continued from page 29

says using Netli's service reduced download times for its customers in Japan by more than 50% on average, says Jeff O'Halloran, manager of Internet services for the company. The most dramatic drop was from 7 seconds to 1.7 seconds in the time it took users in Tokyo to receive Millipore's home page, which originates in Bedford, Mass., he says.

To set up NetLightning, users redirect incoming Web-server traffic to a Netli point of presence, and the service provider takes care of the rest. For Millipore, those administrative changes took about 15 minutes, O'Halloran says. Netli sets up virtual Layer 4 trunks between the POP nearest the server and the POP nearest the requesting computer, basing the trunk on Netli's proprietary replacement for TCP called Netli Protocol.

Netli Protocol over IP uses fewer connections than TCP/IP to access the same Web data. Netli claims, for example, that the protocol can reduce from 31 to two the number of round-trip interactions needed to send a 70K byte Web page with 25 objects on it.

More online!

Companies have tried many options to boost Internet performance for corporate applications.

DocFinder: 5536

Netli Protocol also eliminates the slow-start feature of TCP that builds up the rate at which data is transferred gradually before reaching top speed. These and other refinements of TCP reduce the time it takes to download pages and to interact with Web applications, says Netli CEO John Peters.

While TCP/IP is still used to connect Web servers and remote computers to Netli POPs, the traffic travels a relatively small distance to reach these POPs and introduces little delay relative to the delay incurred when traffic crosses vast reaches of the Internet, Peters says. POP-to-POP tunneling improves response time so applications time-out less often.

Added benefits seen

O'Halloran says alternatives to NetLightning, such as a caching service, cost a little more but also would have required expensive changes to Millipore's Web infrastructure, and that put caching outside the budget.

Netli's service monitoring has had unexpected benefits, O'Halloran says. In one case Netli discovered an unresponsive server about 5 minutes before Millipore did, and isolated a problem with a T-1 line more quickly than Millipore could with its diagnostics, he says.

NetLightning works to improve only HTTP and Secure HTTP-S (HTTP-S) traffic and doesn't improve the downloading of streaming content. It also doesn't improve server slowdowns from traffic spikes.

Alternative services such as those from content delivery network provider Akamai address the flash-crowd problem better, says Peter Christy, co-founder of NetsEdge Research. Whereas Akamai tries to move content close to those who request it, Netli leaves the content where it is but makes it possible to reach it faster. This makes Netli more suitable for sites getting lower volumes of hits, he says.

NetLightning would be a good fit for customers that have Web applications they want their employees or business partners to reach reliably, Christy says.

Typically, the most delay is introduced between regions, so Netli has distributed 13 POPs to oversee traffic among them. Several POPs are in the U.S. where traffic is heavy. The POPs are in London, Tokyo, Shanghai, China, Singapore, Sydney, Australia, Seattle, San Francisco, Los Angeles, Chicago, Dallas, Boston, Atlanta and Washington, D.C.

These POPs are housed in collocation facilities run by Equinix and InterNAP. Peters says Netli will add more POPs as customer demand dictates.

Netli buy bit IP connections from its POPs to the Internet from multiple carriers around the world including AT&T, Singapore Telecom, NTT and Optus.

Charges for NetLightning are based on the number of applications being handled, peak number of hits they get and whether the traffic is just HTTP or whether it includes HTTP-S. Netli also charges a premium for custom reports on hits. A typical bill ranges from $10,000 to $15,000 per application per month, Netli says. ■

Q A

Rackspace

continued from page 29

took a best-of-breed approach, which allows us to find the best monitoring software for Microsoft. Those are the decisions you don't make when you're going cross-platforms and trying to satisfy a Linux user as well as a Microsoft user. While we're not going to be all things to all people, we're a great fit for someone who is hosting a complex Microsoft Web site.

Have larger companies been coming to Rackspace?

Because we are profitable, cash flowing and stable, and focused on a narrow slice of this market that we can serve extremely well, we have been a great alternative for those people who were fleeing the once-great hosting provider. As a result, we've grown 5% last year and we're on track for huge growth again this year.

What percentage of that growth is the larger enterprise customer?

Two-thirds of our business today is large customers, whereas when we started 95% was small customers.

Whom do you consider competitors?

It's Digex. We do compete with IBM now and then. When you need an end-to-end consulting, development and hosting and maintenance service, IBM is the place to go. But many people don't want to pay the cost and don't have the need to be at IBM. So for everyone else, they belong at a proactive hosting company like Digex or like Rackspace's Intensive offering.

So as you're gaining more enterprise customers, what are the changing demands from customers as your customer base shifts?

We're going to enter those segments and provide those services that are the must-have services, the things that the vital elements that managed hosting requires. We're not going to go and explode our offering in 20 directions. We're not going to support Sybase or Informix or DB2. We're going to stick to the things that we can do really well, and the customers that are a good fit will choose us and those who aren't will go elsewhere. ■

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Technology Update

- AN INSIDE LOOK AT THE TECHNOLOGIES AND STANDARDS SHAPING YOUR NETWORK

SAML sets up single sign-on

- BY WILLIAM PERLOWITZ

Users are forced to maintain multiple identities between employers, portals, user communities and business services, resulting in isolated business relationships and experiences. A federated identity is the key to eliminating this fragmentation.

To achieve widespread adoption of federated commerce, a standardized, multi-vendor, Web-based architecture using commonly deployed technologies, such as the Liberty Alliance Project's Liberty Architecture, must be accepted and implemented. Single sign-on (SSO), which is the means by which a Web service conveys to another that a user is authenticated. Security Assertion Markup Language (SAML) provides a framework for SSO capabilities.

With SAML, a user would sign on at one Web site, and, if authorized, authentication could carry forward to the site of cooperating companies. Making travel reservations, for example, could become significantly easier; a user would sign on at an airline's portal and quickly arrange for car rental and hotel rooms at other companies' sites without having to wade through their sign-on processes.

SAML enables the exchange of authentication and authorization information about users, devices or any identifiable entity — "subjects," in the vernacular of the standard. Using a subset of XML, SAML defines the request-response protocol by which systems accept or reject subject "assertions."

SAML defines three types of assertions:

- Authentication, indicating that a subject was authenticated previously by some means (such as password, hardware token or X.509 public key).
- Authorization, indicating that a subject should be granted or denied resource access.
- Attribution, indicating that the subject is associated with attributes.

SAML does not specify how much confidence should be placed in an assertion. Local systems decide if security levels and policies of a given application are sufficient to protect a company if damage results from an authorization decision based on an inaccurate assertion. This characteristic of SAML is likely to spur trust relationships and operational agreements among Web-based businesses in which each agrees to adhere to a baseline level of verification before accepting an assertion.

SAML can be bound with multiple communication and transport protocols. It can be linked with Simple Object Access Protocol over HTTP.

SAML operates without cookies in one of two profiles: browser/artifact and browser/post. Using browser/artifact, a SAML artifact is carried as part of a URL query string. A SAML artifact is a pointer to an assertion. With browser/post, SAML assertions are uploaded to the browser within an HTML form and conveyed to the destination site as part of an HTTP post payload.

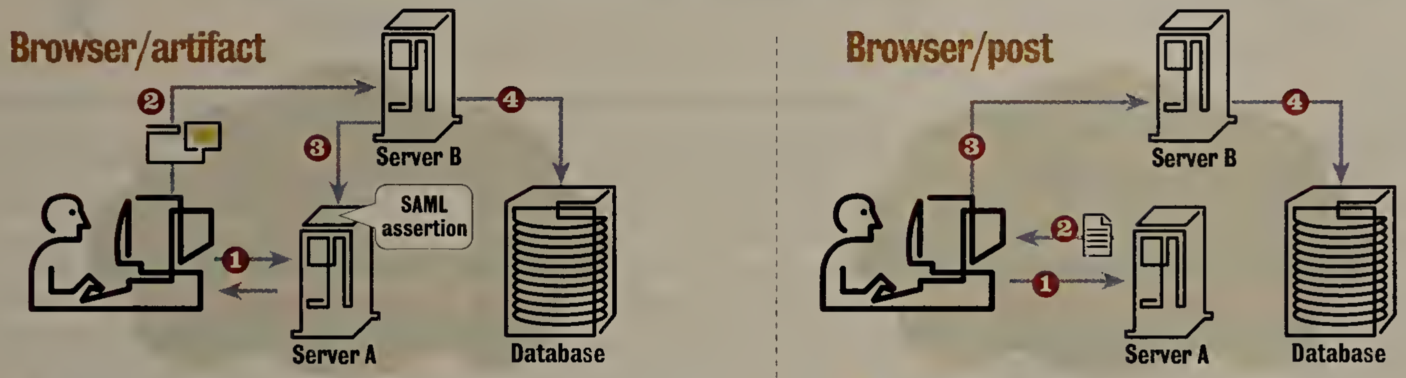
The effect of SAML will be multifold. With single-password access to SAML-enabled Web-based services from multiple portals, access will be less time-consuming and tedious. Meanwhile, companies will be able to establish new business partnerships and create Web-based services that provide consumers with choice, convenience and control.

Perlowitz is CTO for Reliable Integration Services. He can be reached at bperlowitz@risi.com.

HOW IT WORKS

Security Assertion Markup Language

SAML provides a framework for Web sites to offer single sign-on capabilities. It passes authentication and authorization data through browser/artifact or browser/post profiles.



Browser/artifact

① Authenticated browser user on Server A requests access to database on Server B. Server A generates URL redirect, which contains SAML artifact, to Server B.

② Browser redirects user to Server B, which receives artifact pointing to the assertion on Server A.

③ Server B sends artifact to Server A and gets full assertion.

④ Server B checks assertion and either validates or rejects user's request for access to database.

Browser/post

① Authenticated browser user on Server A requests access to database on Server B.

② Server A generates an HTML form with SAML assertion and returns it to user.

③ Browser posts the form to Server B.

④ Server B checks assertion and either allows or denies user's request for access to database.

Ask Dr. Internet

By Steve Blass

My G3 iBook uses dial-up to connect to the Internet. I'd like to get a cell phone instead of a land line. What kind of cable would I need to connect the laptop to the cell phone, and how much do these cost? Or can I use an AirPort connection, since the laptop has an AirPort card. The current land-line connection is around 48K bit/sec, so I'd like to get at least the same speed.

The best way to find cell phone-based Internet service that works is to take the iBook to the cell phone store and say "Show me." Cost, coverage and cabling varies by phone and provider. Another approach is to find someone using such service successfully in your area and get what they use. EarthLink and others are starting to offer wireless Internet service that might be the answer, if you can get it. The services are like wireless DSL at speeds of around 144K bit/sec. Your AirPort card could connect to a wireless LAN, but you would need a broadband connection (cable or DSL) to get to the Internet. Many cell-phone Internet connections today are still slower than land lines and rely on compression technology to improve throughput. Documents could move pretty quickly, but images and multimedia files might not.

Blass is a network architect at Change@Work in Houston. He can be reached at dr.internet@changeatwork.com.

GEARHEAD
INSIDE THE NETWORK MACHINE
Mark Gibbs

Windows registry revelations

So from the last two weeks of discussion we know about the logical and physical structure of the Windows registry. This week, we'll be rampant with registry revelations, so cry "havoc" and let loose the geeks of tech....

The sharp-eyed among you will have noticed in our last column that some hives were missing from the list of which files were used to store which hives. The reason is that some hives are volatile and don't get saved — they are created and exist just for the life of a user session.

These hives are HKEY_LOCAL_MACHINE, HKEY_LOCAL_MACHINE\SYSTEM\ CurrentControlSet\ Control\IDConfigDB\Hardware Profiles, HKEY_LOCAL_MACHINE\HARDWARE and HKEY_LOCAL_MACHINE\SYSTEM\Clone.

You can explore the registry using the RegEdit utility that comes with Windows (under NT and 2000 there's also RegEdt32 with a different interface). You can fire up this puppy by going to Start | Run and then enter "regedit" to get access to your registry. You also can access registries on other machines if you have the privileges.

Note that under regedit you can export and import keys saved in files with the extension .REG. These files can be edited with any text editor but, once again, be very careful because if you carelessly edit a .REG file and load it into a registry you can destroy a PC in a heartbeat.

Locked down

All of which brings us to security: Without a security system to control access, the registry would be a disaster waiting to happen. So it will come as no surprise that registry keys and their values have permissions that can be set to determine who can view and edit them.

Choose any key and right click, then select "permissions." You'll see that there are 11 permissions that can be applied to a key, its subkeys, or the key and its subkeys. The permissions are Query Value, to read one of the key's values; Set Value, to change a key value or create a new key value; Create Subkey, to create a new subkey under the current key; Enumerate Subkeys, to query the key for a list of its subkeys; Notify, to generate notification events via key changes and record the events in the system log; Create Link, to create a symbolic link to the key; Delete, to delete the key, one of its subkeys or one of its values; Write DAC, to change the security permissions of a key and its subkeys and values (DAC stands for Discretionary Access Control, a list controlled by the owner of an object that specifies the access specific users or groups can have to that object); and Read Control, to access the security permissions for the key.

Sometimes, programs will mess with your registry permission settings by accident, or one of the hive files will get corrupted and then everything goes to hell. If you can access the registry you can edit the permissions directly using regedit, but be careful! Set the wrong permissions and your day quickly will become even worse.

Useful tools

Microsoft supplies a number of tools for working with the registry, most of which are included in the company's resource kits, but the majority of this software is unsupported. These tools cover functions that include testing, cleaning up, copying and so on. They are OK but not great. So, of course, third-party vendors got into the act: A tool that we really like for exploring and working with the registry is Re_splendent Registrar from Resplendence Software Projects www.resplendence.com).

Resplendent Registrar works on Windows XP, 2000, NT, ME and 9x, and is the best replacement we've found for RegEdit or RegEdt32, the registry editors bundled with Windows.

Resplendent Registrar lets you create, delete, cut, paste, copy, compare, and move keys and values. A really cool feature lets you add comments to keys with the bookmark editor, and you can color-code bookmarked keys. Resplendent Registrar includes a registry monitor that tracks and logs registry activity and allows for restoring changes external applications made.

Another interesting and powerful feature is an option to defragment the registry, which removes unused space for registries under Windows XP, 2000 or NT. Defragging the registry can improve system and application performance. Sometimes it also can fix those weird problems we all run into and manage to fix but never know quite how we did it or why it was a problem in the first place. But we digress ...

The proverbial bottom line is that Resplendent Registrar is an invaluable tool and for $45, very reasonably priced.

So we now have a pretty good grounding in the hows and whys of the registry. Next week, the what. Register your thoughts at gearhead@gibbs.com.

Cool Tools

Quick takes on high-tech toys

By Keith Shaw

This week we've got a couple of tools that provide interesting mobility features:

GN Netcom wireless conferencing

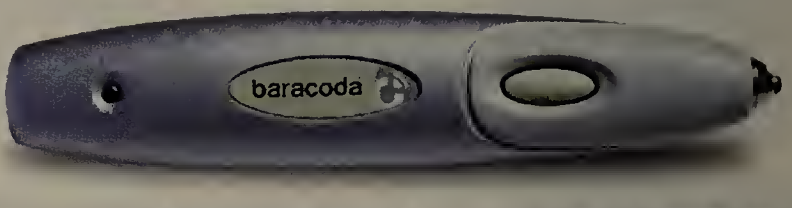
We have weekly meetings, and we also have a distributed staff. Those of us in the office usually crowd around a speakerphone, where we hear voices of our co-workers coming out of tiny speakers.

So we were intrigued when GN Netcom sent us the GN 9120 system, which consists of a tiny base station that connects to a telephone and some GN 100 wireless (2.4GHz) headsets. The base station acts like a cordless hub for teleconferencing. A person with the GN 9120 connected to the speakerphone can initiate a conference call, and other wireless headsets can then associate their headsets to the base station. Instead of people crowding around a tiny telephone, people can sit back and talk through the wireless headset. And the base stations have a range of about 300 feet, so participants also can roam around, go back to their desks.

Setting up the system takes a few minutes (basically figuring out which cord goes where to connect the base station). While the benefit of being able to move around was cool, the sound quality of the headsets was a bit disappointing. Several times, the person on the other end of the call said they couldn't hear us, even though we were speaking at a normal volume. The boom microphone on the headset we received was too short. (The company Web site says headsets with longer microphones are available. Use those.) And while the two speakers "in house" could hear each other clearly, we had a hard time hearing the person on the other end of the conference. It's possible that some of the volume settings on the headsets were not aligned correctly, but we thought the sound quality could have been better out of the box.

So you give something away for the benefit of being able to roam or not crowd around a telephone. It costs $350. If that appeals to you, check out the Web site at www.gnnetcom.com.

The GN 9120 system lets you get away from meetings via speakerphone.



The BaracodaPencil scans bar codes without wire connection.

Baracoda Bluetooth "pencil"

The BaracodaPencil is a bar-code scanner the size of a Magic Marker that connects to a computer via Bluetooth. Basically, the pencil lets users scan bar codes directly into an application without having to be connected via a wire.

The BaracodaPencil uses the BlueCore chip from Cambridge Silicon Radio (CSR) for its Bluetooth abilities. The chip features low power consumption, which the company says lets the scanner conduct about 2,000 scans per charge (it comes with a recharger). The scanner can connect to a desktop/laptop application, but also can connect to a PDA or tablet PC. The design lets it double as a stylus for either a PDA or tablet.

Based on some previous Bluetooth installations, we were dreading the setup, but we found this one relatively simple (the kit came with a Bluetooth USB dongle that we connected to a laptop). While we didn't have any fancy applications to work with (Baracoda says it can help developers create specific applications for use with the scanner), the scanner works with some Windows applications, such as Excel and WordPad. We ran around the office scanning bar codes off everything we could find, and the digits of the bar code magically appeared in our application.

Scanning a bar code took some practice — we thought a slow scan across the code would work best, but the opposite was true. We also had difficulty scanning codes on products that were not solid, such as on a bag of potato chips.

The scanner's range is limited by the range of Bluetooth. We knew we had a successful scan when we could hear the click from the dongle or could see the bar code's number appear on the laptop screen. While a green light on the scanner signifies a successful scan, we trusted our eyes and ears more than checking for the green light. We don't think that people who use this with a PDA or tablet will have this problem, as they'll be carrying that device with them. The cost of the scanner is $250.

For more information, go to www.baracoda.com.

Shaw can be reached at kshaw@nww.com.

NETWORLD+INTEROP

SHOW PLANNER 2003

"We're getting into the concept phase for a lot of these technologies. . ."

— Mike Millikin, senior vice president, Interop Worldwide

This year might not have resulted in the tech boost the industry hoped for, but that doesn't mean network innovation has ground to a halt. Advancements are happening, and NetWorld+Interop Las Vegas 2003 is the place to see some of the latest technologies put to the test in real-world environments. Mike Millikin, senior vice president of Interop Worldwide, says attendees will get a look at everything from autonomic computing and Multi-protocol Label Switching to 802.1x and iSCSI.

"We're getting into the concept phase for a lot of these technologies, working through the details of how we actually deploy them broadly," he says. "It's a very good counterpoint to the gloom and doom that may be out there in terms of: 'There's nothing new. It's all stale, and there's no growth.' There's a lot of growth potential, and people have to see the possibilities and understand how to hook things together. [N+I] is one of the ways they do it."

Microsoft will tout its Windows Server 2003, running a hands-on workshop to let users work through issues such as security and Active Directory, Millikin says. Of course, the show also will include experts leading hundreds of workshops, tutorials and seminars.

Millikin says he expects as many as 40,000 people to head to the Las Vegas Convention Center for N+I. So if you're one of them, keep this planner on hand. We've picked out some of the highlights of the weeklong event to help you navigate through dozens of offerings and get the most out of the show.

MONDAY APRIL 28

PICK OF THE DAY

VPN days

9 a.m. to 5 p.m. Monday and Tuesday

With employees increasingly on the move, it's a challenge to keep them constantly connected. VPN Day 1 and Day 2 will aim to provide the fundamentals and real-world examples you need to make tough decisions about VPNs in your network.

VPN Day 1: Fundamentals, Fred Avolio, principal at Avolio Consulting, and Dave Piscitello, president of Core Competence, will lay out the basics of VPNs. The day will end with a debate about whether VPNs are necessary and discussions around questions you should ask your VPN vendor.

VPN Day 2: IP Security design and deployment will build on the fundamentals outlined in VPN Day 1. Joel Snyder of Opus One will lead Tuesday's all-day seminar that will address how to build real-world IPSec-based VPNs and integrate them into existing network infrastructure.

This session will include general design principles important in any IPSec VPN implementation, including addressing, firewalls, routing, security and authentication; focus on site-to-site issues such as how to design and deploy site-to-site VPNs throughout your business; and demonstrate how remote access VPNs can be established and managed securely.

Tutorial: Future networking solutions: Broadband access, Gigabit Ethernet, wireless, IP mobility, storage, MPLS, QoS, IP & optical, UCP, IPv6

8:30 a.m. to 4:30 p.m.

Applications such as videoconferencing, storage and voice over IP are becoming critical to business, and networks must be designed to support them. This tutorial, led by Cisco network consultant Peter Tomsu, will provide insight into how best to design and deploy networks using the latest technology. It will cover everything from broadband, Gigabit Ethernet and wireless to dense wavelength division multiplexing and iSCSI. The tutorial also will cover Multi-protocol Label Switching, MPLS VPNs, quality of service, traffic engineering and advanced control planes, which allow centralized management of different network protocols such as SONET and ATM.

The New Age data center

1 to 2 p.m.

Security, scalability and redundancy are key in today's data centers. Years ago, that meant running multiple dedicated servers. Next came multifunction appliances, which reduced some of that mess. These days the focus is on virtualization. James Metzler, vice president, Ashton, Metzler & Associates; Dave Roberts, vice president of strategy and co-founder of Inkra Networks; and Peter Manca, vice president of software engineering at Engenera, will walk you through the latest in data center virtualization and talk about which technologies are ready for prime time.

Breakthrough technologies

4:15 to 5:15 p.m.

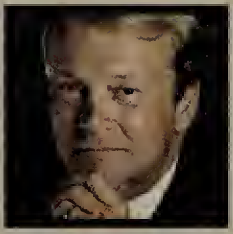
While it's not clear when the tech sector will pick up, one thing is clear: Innovation is still happening. In this session, Johna Till Johnson, president and chief research officer at Nemertes Research and a *Network World* columnist, and Marv Chartoff, CTO Infrastructure Transformation Services at Unisys, will detail some technologies they believe will be "breakthrough" technologies in the years to come.

Areas include "integration technologies" such as application portals and utility computing that focus on bringing together users, applications and resources to enhance productivity.

TUESDAY APRIL 29

PICK OF THE DAY

John Chambers keynote: Driving the next phase of productivity and technology innovation



John Chambers

9 to 10 a.m.

John Chambers, president and CEO of Cisco, will open Interop with a keynote address on how to drive productivity by taking a new approach to networking. Chambers will talk about the Intelligent Information Network, which is based on a "network of networks" where service provider networks, enterprise networks, the Internet and other environments are seamlessly integrated. "CIOs and technologists will decide on which type of infrastructure they implement, and Cisco's goal is to be the company to deliver the networks that provide the greatest productivity gains, regardless of network type," the company says.

Self-healing networks: Fact or fantasy

10:15 to 11:15 a.m.

It's every network manager's dream — a network that identifies problems and heals itself, all without human intervention. Dennis Drogseth, vice president of Enterprise Management Associates and co-author of Network World's Network/Systems Management newsletter, will moderate this panel discussion with Sangeeta Anand, vice president of product management, Internet Technologies Division, at Cisco; Trent Waterhouse, director of marketing at Arisma Management Technologies; Tom Bishop, CTO at Vieo; Jeff Barker, director of product marketing at Packeteer; and Cathy Fulton, CTO, NetQoS. The panel will discuss the latest in technologies that predict problems and take appropriate automated action.

Storage meets the network: Convergence or train wreck?

11:30 a.m. to 12:30 p.m.

Storage and network technology have combined to create storage-area networks. Along with the benefits of having storage available across network infrastructure, however, are the drawbacks associated with any high-volume application. Ann Skamarock, senior analyst at Enterprise Management Associates and co-author of Network World's Storage newsletter, will lead this debate about the pros and cons of networked storage. Steve Kleinman, CTO, Network Appliance; Bill Huber, CTO/vice president of engineering, StoneFly Networks; Mike Feinberg, CTO, HP; and Tom Edsall, CTO, Andiamo/Cisco will discuss how to get the most out of SANs.

Security information management

2 to 3:15 p.m.

Managing security can become a headache for network administrators dealing with myriad management, analysis and reporting tools from multiple vendors. Ellen Messmer, a senior editor at *Network World*, will lead this discussion about how the latest products might make it easier to monitor and analyze threats to the network. Bob Dimicco, director of marketing for the Secure Managed Networks Business Unit at Cisco; Niten Ved, COO, NetForensics; Samuel Curry, product management of eTrust Solutions at Computer Associates; Sharon Ruckman, senior director of product management for Symantec Security Response; and Robert Hansen, product manager, managed security scanning and analysis services at Cable & Wireless, will discuss the latest trends in security information management.

Wireless in the wiring closet

3:30 to 4:45 p.m.

Wireless LANs are becoming all the rage as companies seek to untether their workforce. But there are questions about security and performance as this network architecture is put in place. Gartner principal analyst Rachna Ahlawat will talk about how network managers can apply the principles they use for wired LANs to wireless and hybrid wired and wireless networks. Pankaj Manglik, founder and CEO, Aruba Networks; Brett Galloway, CEO, Airespace; Dan Simone, vice president product management, Trapeze Networks; Ron Seide, product manager at Cisco; and Ray Martino, vice president of marketing at Symbol Technologies will join in the discussion to close Tuesday's Wireless LAN debate.

ILabs to hit on wireless security, iSCSI and MPLS

Network World is the exclusive media sponsor of the InteropNet Labs (iLabs), N+I's live test bed designed to give attendees hands-on, unbiased insight into the state of emerging technologies. ILabs will be located on the show floor, open to all attendees, and runs during exhibition hours. A team of volunteer network engineers, including Network World Test Alliance partner Joel Snyder of Opus One, will conduct these demonstrations.

ILabs will focus on wireless LAN security where engineers will investigate how 802.1x, Extensible Authentication Protocol, 802.11i and IP Security can be used to build interoperable and secure, wireless networks; IP storage networking where engineers will demonstrate how iSCSI-based storage gear can lead to innovative data storage scenarios; and Multi-protocol Label Switching, where testers will implement interoperable point-to-multipoint Layer 2 VPNs, test the resiliency features of MPLS gear. It will demonstrate how quality-of-service mechanisms within companies can be combined with these technologies to provide definable end-to-end service.

In addition to the test demonstrations, iLabs engineers offer classes that are based on the iLabs testing and their experience in working with these technologies, giving attendees insight into when these technologies could become useful in their enterprise networks.

For more information: ilabs@interop.net.

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WEDNESDAY APRIL 30

PICK OF THE DAY

Autonomic Computing: Vision to value

Beginning at 10 a.m.

HP, IBM and Sun have talked up autonomic computing. But what is this promise of self-configuring, self-healing networks all about? This one-day workshop, developed by IBM's research division, is designed to provide some insight into how this approach can work in your network.

Alan Ganek, vice president IBM Autonomic Computing, will talk about autonomic computing as a key way of advancing your IT infrastructure as systems become more complex and more difficult and expensive to manage. The idea behind autonomic computing is to keep systems up and running by letting them shift workloads and detect and respond to problems without human intervention.

Ganek will demonstrate how this technology can help your network better support business processes and let you transform your network into an on-demand type of operation.

Network storage protocols: The good, the bad and the ugly

9 to 10 a.m.

The Network Storage Strategies track will open with this session that will aim to make sense of the alphabet soup of storage interconnects. There is Fibre Channel, iSCSI, Fibre Channel over IP and Internet Fibre Channel Protocol, all of which can be used to move data within the storage architecture. Kevin Daly, CEO of Avamar Technologies, will look at standards work in progress with these protocols and will talk about how they can be applied within your storage network.

Security technology report card

10:15 to 11:15 a.m.

Do you have the tools you need to protect your network from infiltrators? This session, which is part of the Internet Security — Reality or Myth track, will take a look at security technology available today. David Piscitello, president of Core Competence, moderates this discussion about the value of today's security tools. Speakers will include Paul V. Mockapetris, chief scientist at Nominum; and Dave Steele, an attorney at the law firm Christie, Parker & Hale.

Adaptive management tools: Can you keep up with your environment?

11:30 a.m. to 12:30 p.m.

With today's network environments changing at lightning speed, management software may have a hard time keeping up. After all, any management tool is only as good as the information it can collect, and in today's environments the data might be old by the time it can be processed. Rick Sturm, principal at Enterprise Management Associates and co-author of Network World's Network/Systems Management newsletter, will preside over this discussion of adaptive management tools that quickly detect changes and react to them. Speakers will include Bill Merrow, senior vice president of development, Unicenter, at Computer Associates; Bill Emmett, solutions marketing manager at HP; Sandra Carter, vice president of marketing for Tivoli Software at IBM; and Charlie Boyle, director of N1 Architecture at Sun.

IPSec: Wrestle with it, fix it or choose an alternative?

2 to 3:15 p.m.

Are VPNs on your road map, but you're still scratching your head over the best security to deploy? This session, part of the Internet Security — Reality or Myth track, might help you reach some decisions. David Piscitello, president of Core Competence, will lead this discussion about IP Security (IPSec), and protocols such as Secure Sockets Layer (SSL) and TSL (Transport Layer Security) in VPN environments. Chris Hopen, CTO, Aventail; Joel Snyder, senior partner, Opus One; and Paul Hoffman, director of the VPN Consortium, will talk about the benefits of SSL/TSL vs. IPSec.

Networked storage and the future

3:30 to 4:45 p.m.

Where does networked storage fall on your to-do list? For many network managers, it's rising in priority. This session will look at what's ahead when it comes to

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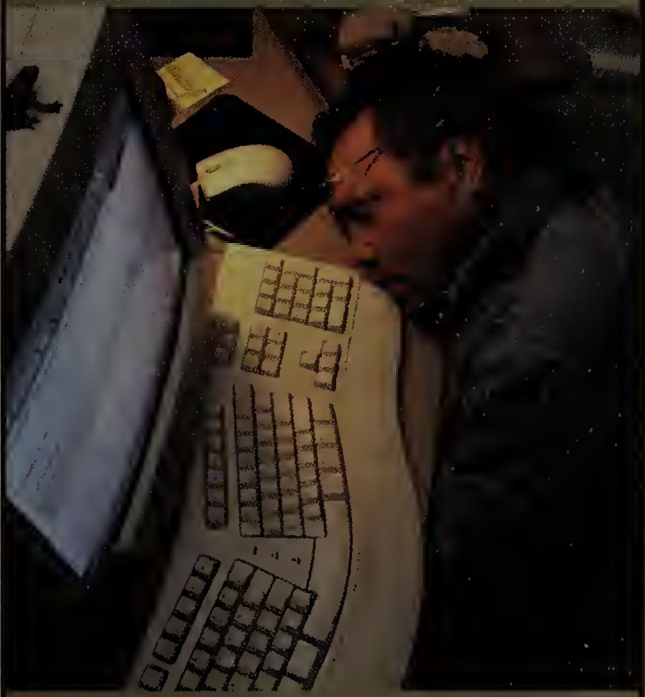

This man is fixing a memory leak on his email server, clearing space on a full disk drive, shutting down Doom on his CRM server and repelling a security attack.

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putting storage online. Steve Sicola, vice president of network storage architecture at Seagate Technology, will talk about the future of data storage, what technologies are up and coming, what the hurdles are for technologies and where the whole networked storage effort is heading when it comes to security, management and scalability.

THURSDAY MAY 1

Web application integration

9 to 10 a.m.

Web-based applications are likely gobbling up greater amounts of your network bandwidth. At the same time you might have questions such as how to troubleshoot problems associated with online applications, how to ensure they stay high-performing and how to avoid performance degradation on the network. Peter Sevcik, president of NetForecast, will take a broad look at how Web applications might affect your network. He'll help you figure out how to steel your network for the onslaught of application traffic.

.Net Server vs. Windows 2000: What's new and should I care?

10:15 to 11:15 a.m.

You're probably migrating from Windows NT to Windows 2000, if you haven't already. Next will be the move to Microsoft .Net. During this session, Eric Stal, a partner at EK&C Partners, will talk about what's new in .Net Server and how it might benefit your network. Stal also will look at the value of each new feature to help you figure out when the time will be right to move from Win 2000 to .Net.

Port 80: Sum of all fears?

11:30 a.m. to 12:30 p.m.

Port 80 is the primary gateway for incoming and outgoing Web traffic. Is it also a wide-open door for threats to your network? Web services and Web-enabled applications result in heavy traffic through Port 80, and it's often difficult to tell what's OK and what's not. Stuart McClure, president and CTO of Foundstone, will talk about the top 10 vulnerabilities to your network as a result of the growing amount of content and application data flowing through Port 80. He'll also clue you in on common exploits of Port 80 and give you some hints on how to keep Port 80 trouble free.

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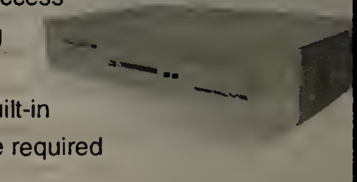

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EDITORIAL

John Dix

High marks for Capellas' first 100 days

You have to give WorldCom CEO Michael Capellas credit for achieving what he has in 100 days. For a complete telecom outsider to stabilize and then give direction to a bankrupt carrier laden with $40 billion in debt and wrestling with an $11 billion accounting scandal is, well, fairly miraculous. This will be the stuff of business school case studies.

In a staged, outdoor rah-rah fest in front of a few hundred employees waving company-provided signs that said things like "Focused and fast," Capellas said he sometimes affectionately equated working through the 100-day plan with a death march.

While that seems an odd analogy, it might be truer than we know. Only time will tell how close the company came to calling it quits.

But Capellas deserves to be proud of recent achievements. In 100 days the company has:

- Appointed a new management team and a new board.
- Completed a three-year strategic plan.
- Rebranded the company MCI and launched a media blitz to drive it home.
- Convinced 90% of its debtors to sign on to a reorganization plan that reportedly will pay out 36 cents on the dollar.

What's more, Capellas says first quarter sales were up 30% compared with the fourth quarter, the company returned to profitability in the month of January, and cash flow remains positive. MCI has about $3 billion of cash in hand, he says.

Ultimately the company hopes to emerge from bankruptcy later this year with only $4.5 billion to $5.5 billion in debt.

Just as impressive is MCI's ability to look to the future even as it struggles to leave the past behind. Part of the new three-year plan calls for pushing a convergence story based on the company's strong Internet heritage and global presence. While this might help land customers, it also could help reduce costs. The plan is to have 25% of MCI backbone voice traffic based on IP later this year.

For all of that, MCI still faces a tough uphill battle. The company expects revenue this year of $25 billion, down from $35 billion in 2001, and expects $26 billion in 2004. That might be optimistic given many customers are locked into three-year or longer contracts, and we haven't seen the last of how they will vote as the contracts expire.

But goodness knows we need the diversity a healthy MCI would provide.

— John Dix
Editor In Chief
jdix@nww.com

More on managed services

In his column "Opening our minds to managed services" (www.nwfusion.com, DocFinder: 5223), Steven Taylor provides a valuable lesson in the importance of organizations seriously taking managed services into account, but leaves the reader still confused about what managed services are. True managed service does not represent a simple monitoring of network devices; rather, true remote managed services (RMS) are active offerings that take the burden of administration off the IT staff and shift the quality of service to the provider. The winners of the RMS market are going to be the integrators who have focused on service delivery and on-site management of computing resources.

Valerie Perlowitz
President and CEO
Reliable Integration Services
Dunn Loring, Va.

Fight viruses with education

Regarding Julie Johnson's letter to the editor on Paul McNamara's 'Net Buzz column about .DOC attachments (DocFinder: 5224): Most network administrators and IT consultants are seen as the "Big Bad Wolf" for the restrictions and procedures they put in place to secure and maintain networked computing environments. From my experience, what causes such feelings to arise is the lack of follow-through and training provided to end users. This is likely the scenario in Johnson's situation based on her comments.

Without those policies and procedures in place, downtime would be considerably higher, and productivity would be affected in a much greater way.

The main cause of network downtime is virus infections. Effectively warding off potential virus attacks requires a combination of antivirus software and end users being educated on antivirus policies and procedures. Only discipline and education, coupled with software or hardware products, can work effectively.

Hugh Meighan
CEO
TNTConnect
Miami Shores, Fla.

E-mail letters to jdix@nww.com or send them to John Dix, Editor In Chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

The way forward

Regarding Thomas Nolle's column "An industry of whiners" (DocFinder: 5225): Only when everyone realizes that the current business and technology model for the telecom system is state of the art for the 1930s will we be able to move forward. Expecting any solution from the existing monopolies is like asking sailboat companies to deliver nuclear submarines. The future is not an intelligent core; it is an intelligent edge with a "stupid network."

Tom Moline
CEO/CTO
Prototyme
Faribault, Minn.

Tough job market

Thanks to Barton McKinley for his thoughtful commentary ("Reaching out to the unemployed," DocFinder: 5226).

I have been out of work for almost a year after being laid off from WorldCom. As someone who has a BSEE and 18 years of experience in network planning and systems development, I thought it wouldn't be too hard to find something right away. Man, was I wrong. No doubt about it; this is the toughest job market of my working lifetime.

Al Cipparone
Burke, Va.

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STRATEGY SESSION

Jeff Kaplan

Movement under the radar

My February column on utility computing (www.nwfusion.com, DocFinder: 5141) generated responses from utility computing providers that serve small and midsize businesses, and vertical industries out of the spotlight of the trade press and analyst firms. The growing acceptance of utility computing as a new outsourcing model at the low end of the market also should be encouraging for larger companies that are considering these services for their branch offices and remote workers.

A recent Gartner survey of 43 business process outsourcing providers found that while they continue to focus on large corporations, the proportion of midmarket companies with revenues of less than $500 million taking advantage of their services grew from 25% in 2001 to 36% in 2002. The finding confirms the experience of UCPs that also are finding SMBs more receptive to outsourcing a portion of their IT operations on a subscription-fee basis.

UCPs vary in origin, target customer and services, but all benefit from the growing demand for their services. For example, Perimeter Internetworking in Trumbull, Conn., has taken a vertical market approach, offering packaged network infrastructure and security services to community banks that generally have limited internal IT/network staff but face growing regulatory requirements for disaster recovery and business continuity. The Telluride Group in Newton, Mass., has evolved from a typical onsite IT services business helping companies with fewer than 50 employees to delivering most of its desktop and network services remotely. CBE Technologies in Boston offers a variety of turnkey onsite and remote desktop, security, storage and network services to SMBs and government agencies. All these companies have experienced a significant surge in customers over the past year.

This trend also is timely in light of the recent announcement by BellSouth and IBM of a new joint utility-computing venture focusing on SMBs. I wouldn't be surprised to see the other carriers partner with companies such as Computer Sciences Corp., Electronic Data Systems, HP and IBM to attack the SMB market. This effort would include a greater push to serve the branch offices and remote workers of larger companies that are trying to reduce the cost of supporting these peripheral IT users.

As in any buyer's market, SMBs and larger firms can benefit from this growing competition. However, don't be fooled into selecting the UCP with the lowest price or biggest name. Relying on a UCP to perform an IT and/or business function is a major decision that puts your organization at the mercy of your provider. Beware of UCPs desperate enough to undercut their competitors to win your business but not financially stable enough to survive. And be careful of telephone companies and IT vendors experienced in serving large companies that might not be able to scale down their services to meet the needs of SMBs.

Don't be fooled into selecting the UCP with the lowest price or biggest name.

Kaplan is managing director of THINKstrategies, a consultancy in Wellesley, Mass. He can be reached at jkaplan@thinkstrategies.com.

REALITY CHECK

Thomas Nolle

Utilities: The RBOCs' competition

Remember when everyone was all excited about how the Telecommunications Act of 1996 was going to generate competition for local telephony and access services? Remember how all those competitive local exchange carriers were funded by Wall Street and gained all kinds of publicity? Remember how they died? Sure, the whole CLEC venture-funding extravaganza was a big hype wave, but are we now doomed to having no competition at all for the regional Bell operating companies?

Apparently not. The first realistic model for local exchange competition is emerging now — from the electric company.

Last month, ConEdison Communications (CEC), a division of the giant New York metropolitan public utility, announced that it is expanding its services into the small and midsize business (SMB) market. What makes this announcement newsworthy is that CEC is making money in local competition, and not chump change, either. For that reason, we need to understand how the CEC model works, and how it might work in places other than New York.

CEC got started in 1999 at the height of the bubble period, expecting to become a "carrier of carriers" in New York. When the carriers started dying off, CEC decided to jump into the enterprise market, leveraging the huge number of corporate sites in the city and its opportunity to use rights of way and crews to lay fiber and install communications equipment. CEC became a metropolitan carrier for the Fortune 1000.

To address its market, CEC deployed a fiber-and-electrical backbone network to supply bandwidth. CEC also built its own customer/network control center, integrating best-of-breed tools for a highly optimized framework of customer care and network management. CEC used its own conduits and the subways for diverse routing, and has benefited from corporate fears of network vulnerability. It branched out from SONET to Ethernet, to wavelength division multiplexing, and to using Verizon's facilities to reach businesses that CEC hadn't wired with fiber.

The newest CEC initiative is targeting middle-market customers with 50 to 500 employees, which number nearly 6,000 in the city. While CEC is expanding its own sales force to address these new customers, it's also expanding its Agent Program of resellers. To target this new base, CEC is introducing its PowerNet Internet Service with access speeds ranging from T-1 to Gigabit Ethernet, and including e-mail and DNS. In the future the service is also expected to include Border Gateway Protocol routing. CEC also has voice service, based on T-1 or primary rate ISDN, and is evaluating technologies such as voice over IP, storage-area networks and hosting services. Better yet, CEC is exceeding its sales projections and expects to be net-income-positive by midyear.

How did CEC get it so right when so many others got it wrong? CEC management says it's Business 101 — a focus on making money. Where other CLECs were using free capital to try to grab customers without regard for profitability, CEC was building a network and an operations process that could serve its initial Fortune 1000 market well, and layered on services for the SMB market without facing exploding costs.

Can this model be replicated? It would seem so. Public utilities in other metropolitan areas should be able to follow the CEC model easily. It seems that the big interexchange carriers (IXC) could have created their own metropolitan carrier businesses in New York and other cities. Could it be that they were so obsessed with getting next-to-free unbundled element pricing from the RBOCs that they didn't even try to develop their own networks? CEC uses wholesale/unbundled elements and collocation, but only to extend its network. The company promoted the idea that "competition" meant having your own facilities, even before FCC Chairman Michael Powell caught on to that approach.

The IXCs probably can't get the capital to try CEC's approach now. However, other utilities still have plenty of time to get into the market. Fear of terrorism, concentration of high-value customers and available rights of way aren't unique to New York. Your competitive access provider might well be delivering to you today — but delivering power or water. The future of competition in networking might belong to the utilities.

Public utilities in . . . metropolitan areas should be able to follow the CEC model easily enough.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at tnolle@cimicorp.com.

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NetworkWorld 200

THE Signature SERIES

The Network World 200 Issue is one of six bimonthly special issues providing insights, opinions and information on the biggest trends shaping the networked world. Watch for the You Issue, coming July 21.

Our annual look at the biggest companies in networking

A dip into the cash

These days, the saving and spending of cash tells us one of the more interesting stories about the network industry. The top 10 companies on our Network World 200 list of the largest domestic public network vendors by revenue closed 2002 with $99.3 billion in cash. Add in Cisco, ranked No. 14 in revenue but the second-largest cash holder with $12.7 billion, and 11 vendors accounted for more than half of the total NW200 cash — $207 billion.

Interesting facts, but nothing new: Cisco, IBM Microsoft — these and other NW200 companies long have been cash cows. More telling is the spending trend manifested in 2002.

Last year, a number of NW200 vendors dipped into their cash for acquisitions. Level 3 forked over $242 million for Genuity assets; Symantec spent $375 million for four security firms; Veritas Software plunked down $62 million for Jareva Technologies. And IBM, No. 1 on the NW200 list and eighth-largest cash holder, bought PricewaterhouseCoopers Consulting for $2.7 billion (plus an additional $800 million in stock and convertible notes) and paid $2.1 billion for toolmaker Rational Software.

The network industry always has been acquisitive, just not with cash. Stock deals, including the HP/Compaq mega-merger of 2002, have marked the typical transaction. Those still happen — witness Cisco's recent stock deals for Linksys and SignalWorks — but we should view the vendors' increasing willingness to break out of the stock-transaction mode and spread the green stuff around as a good sign. Cash deals seem more substantive, even perhaps requiring sharper business acumen, than stock transactions (especially when undertaken by IBM and others whose valuations would have let them rely on stock). With more than $100 billion in reserve, let's hope more of the top NW200 companies get bold with their acquisition strategies. The network industry is full of underperforming companies with great technology going to waste.

— Beth Schultz
Editor, Signature Series
bschultz@nww.com

The NW200 in decline

Fraud. Scandal. Bankruptcy. The Network World 200 — the biggest names in networking — stumble through 2002. 47

Sector summaries

2002 was a test of survival for many companies within the enterprise applications, infrastructure and service provider sectors. Yet analysts remain bullish that promising technologies will secure each segment's recovery. 64

Good governance or cheap makeover?

New legislation aims to keep the business scandals of 2002 from repeating. But network vendors may still be glossing over the need for better corporate governance. 67

10 start-ups to watch

These young vendors offer fresh approaches for addressing today's enterprise network challenges, from setting up secure wireless LANs to virtualizing data center resources. 71

Where are they now?

Five years, 50 companies. We look at what's happened to our start-ups to watch, 1998-2002. 77

NW200 online

Visit the Network World 200 portal at www.nwfusion.com/nw200/2003/ for these exclusive features:

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- The NW200 Compare-o-matic, which analyzes the results for two or more vendors of your choosing.
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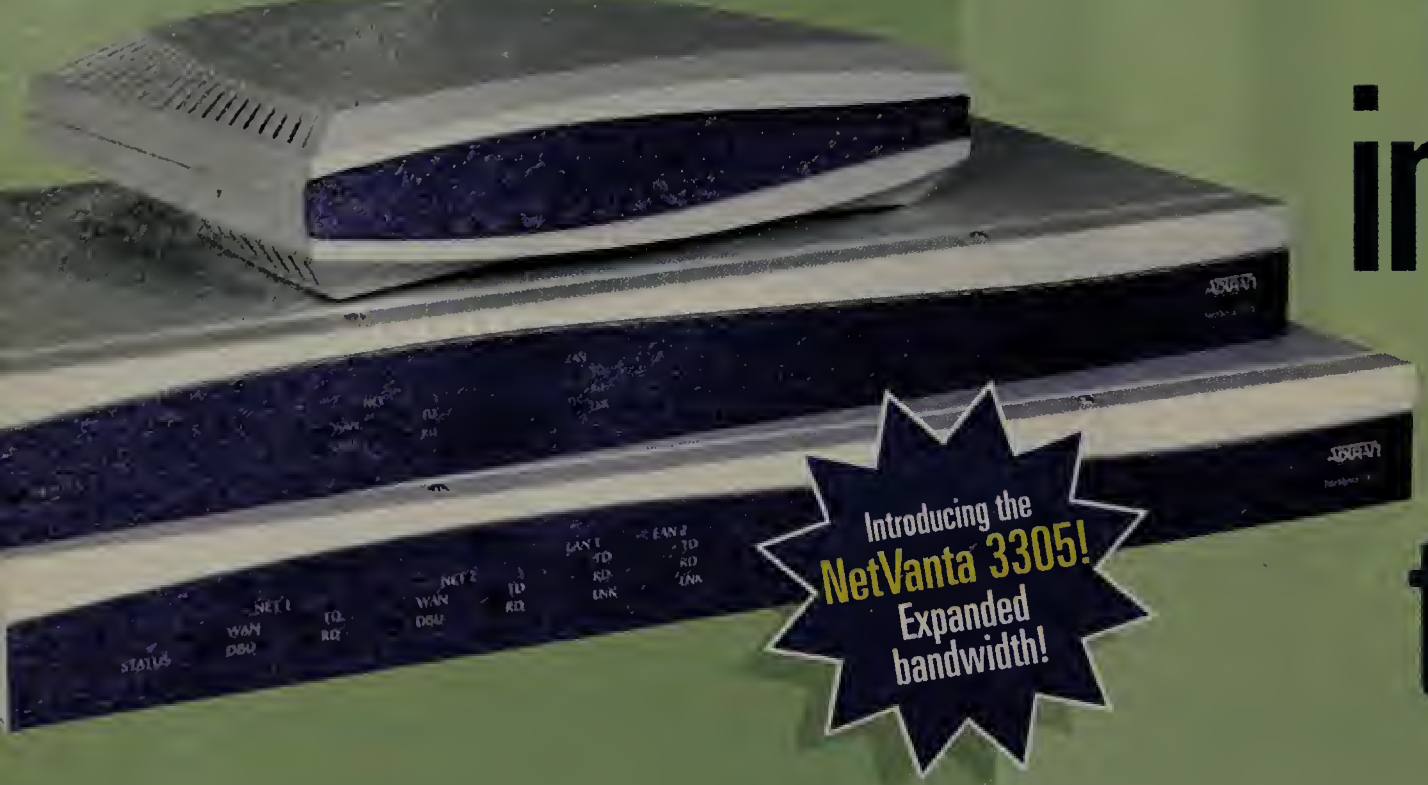

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Fraud.
Scandal.
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The Network World 200
— the biggest names
in networking —
stumble through 2002.

The NW200 in decline

BY JOHN DIX

One thing you can say about 2002 is that there was nothing subtle about it.

The year was pockmarked by fraud on a grand scale, management changes at some of the leading companies and frantic refocusing. The latter wasn't all bad, as companies such as Nortel and 3Com, among others, found new religion about the enterprise market.

But the turmoil left an indelible mark on the Network World 200, our annual list of the largest domestic public network companies. WorldCom didn't make it because it is in Chapter 11, while Broadwing Communications dropped off because it is busy restructuring and waiting until the last minute to close its books (missing our deadline of March 18). That takes $38 billion right off the top of the list.

When you combine the revenue missing from companies in Chapter 11 with the whipsaw effects of the sour economy and a general retreat from IT spending (see graphic, page 50), it's no surprise that revenue for the NW200 dropped 12% from $890 billion in 2001 to $785 billion in 2002. That makes 2001 and 2002 the only years in the NW200's nine-year history for which collective revenue declined.

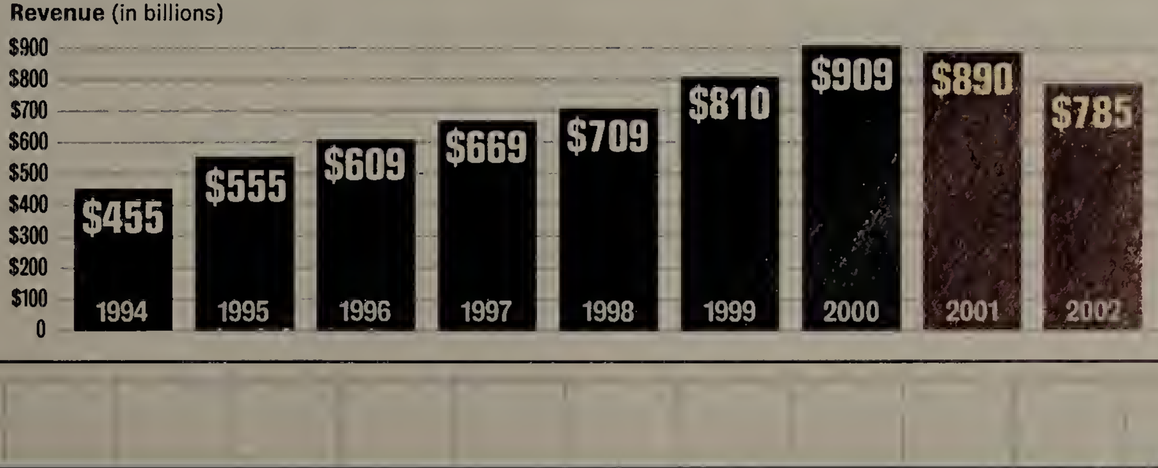
The profit picture was just as bleak: Together the NW200 companies generated about $154 billion in losses, compared with $65 billion in losses in 2001. But that number is deceiving because 1) new accounting rules required companies to write off impaired goodwill immediately instead of over many years, and 2) almost $100 billion of that outsized loss is from a single company: AOL Time Warner.

Of AOL's loss, some $46 billion is attributed to goodwill. Companies end up with goodwill on their balance sheets if, in acquiring another company, they pay more than the market value of that company's assets.

Companies don't have to write off goodwill unless it becomes permanently impaired, meaning it no longer represents the value of the asset. For example, if a company issues a million shares at $100 to buy a company for $100 million, and after the transaction the share price tumbles to $10, the company could write $90 million of

Stepping back

Revenue for the NW200 retreated for the second consecutive year, due in part to Chapter 11 filings — most notably WorldCom's.



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impaired goodwill off its balance sheet.

Companies that went on acquisition sprees in the bubble were left with huge impaired assets after it burst. Of Qwest's $36 billion loss in 2002, for example, $18 billion was in impaired goodwill.

Alfred King, vice chairman of Valuation Research in Milwaukee, says his best guess is that U.S. companies wrote off some $400 billion to $500 billion in goodwill last year.

The numbers are all the more dramatic because everyone took the charges at the same time to comply with regulations that went into effect in January 2002. But the write-offs are what analysts call noncash events, meaning they don't reflect the day-to-day health of an organization. The poor stockholders are the ones whose money has gone up in smoke.

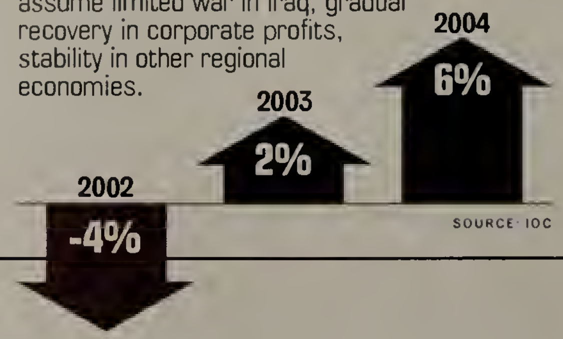
So, as bad as the profit number looks, it is artificially high and not really as dire as it might seem. In fact, more NW200 companies reported profits in 2002 than in 2001: 69 vs. 62. But a few of the losses were real whoppers. Besides AOL's loss — the largest ever in U.S. corporate history — the NW200 includes eight other billion-dollar-plus losses, including AT&T, $13 billion; Qwest, $36 billion; and VeriSign, $4.9 billion.

Clearer skies

One company that did muster a profit is industry bellwether Cisco. Even as revenue dropped 15% to $18.9 billion, the company managed to reduce expenses enough to generate income of $1.9 billion. That compares with the $1 billion loss the company posted in 2001.

IT spending

Total spending in '02: $852 billion. Forecasts assume limited war in Iraq, gradual recovery in corporate profits, stability in other regional economies.



SOURCE: IOC

Cisco's 2002 fiscal year ended in July, so to get a better sense for how the company did in calendar 2002, it is interesting to string together the last two quarters of '02 with the first two quarters of '03. For that period, revenue was up 5% to $19.2 billion compared with the same four quarters spanning '01, and profits were $3.1 billion vs. a $2.3 billion loss in the earlier period.

Either way, the sky is getting brighter for this network demagogue.

The same cannot be said for some of the other network pure plays: 3Com's sales were down 48% last year, Juniper's, 38%; Extreme Networks', 10%; Enterasys Networks', 57%, Foundry Networks', 3%.

Even Avaya, sitting pretty in the hot convergence market, saw sales decline 27%.

But one bright spot was the security sector: Symantec's 26% revenue jump made it a billion-dollar-plus company for the first time; Network Associates' sales grew 16% to $942 million; Internet Security Systems' revenue was up 9% to $243 million; and NetScreen Technologies' sales leapt a whopping 62% to close at $138 million.

Check Point is one security company that didn't fare well. Revenue dropped 19% to $427 million, and profits slid 21% to $255 million. But with a 60% profit margin, Check Point still ranks as one of the top 20 most profitable NW200 companies.

Systems blues

While you can find pockets of good news among the network-only houses, it is harder with the big systems players. Revenue trailed off in 2002 for all the big systems houses.

That is, technically speaking. While the numbers on the chart show Dell sales slipped 2% to $31 billion in fiscal 2002, Dell's year ends in February so those results are mostly for the 2001 calendar year. In Dell's fiscal 2003, which is comparable to the other systems houses' 2002, Dell did much better: Revenue was up 9% to $35 billion and profits were up 37% to $2 billion.

Growth-wise, no one else comes close.

IBM's sales were down 2% to $81 billion for roughly the same period, while profits dropped 54% to $3.6 billion, largely because of charges associated with the acquisition of Pricewater-

Customer focus keeps Dell productive

With its 'customer is king' mantra, Dell ends Palm's two-year reign as the most productive NW200 company.

The ongoing technology slump has done little to dampen spirits at Dell, which edged out PDA makers Palm and Handspring in 2002 to become the most productive Network World 200 company, defined in terms of revenue per employee. Dell, which has been expanding beyond its PC roots into a variety of network sectors, made nearly $901,000 per employee in 2002, compared with $797,000 per employee in 2001.

Dell CEO Michael Dell says the reason for his company's success, even in these tough economic times, is simple: staying in touch with customers.

"We have a relentless focus on our customers. There are no superfluous activities here," he says. "Once we learn directly from our customers what they need, we work closely with partners and vendors to build and ship relevant technologies at a low cost."

And by putting the focus on the customer, employees feel a greater connection with the work they do, Dell says.

"Our employees feel a sense of ownership when they work directly with customers," he says. "Direct relationships are what the company was built on and how Dell continues to thrive."

Dell also has an internal program called Business Process Improvement (BPI) through which "we empower employees to come up with better ways to improve the customer experience, lower costs and increase productivity," Dell says.

Dell says the company saved more than $800 million through its BPI program last year. "It's in our DNA to always look for improvement and do things better," he says.

As for Palm and Handspring, they're still among the most productive NW200 companies — just not the top seat.

— Jennifer Mears

The five most productive NW200 companies

(Determined by 2002 revenue per employee)

Company	Revenue per employee	Rank 2002
Dell	$900,809	7
Palm	$880,300	60
Emulex	$731,897	104
Infonet Services	$660,327	72
Handspring	4628,332	108

Connecting employees with customers makes for a highly productive workforce, says Dell CEO Michael Dell.

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Revenue for HP, merged with Compaq midyear, was $72 billion, down 11% compared with $81 billion in fiscal 2001 on a combined company basis. HP posted a loss of close to $1 billion.

In HP's annual report, CEO Carly Fiorina said: "Our Enterprise Systems Group and our Personal Systems Group each reduced its operating loss by more than 50% in the fourth quarter from the third quarter — while ESG's revenue grew more than 8%, and PSG's revenue increased by 6% in the same period."

If you add up IDC's total server shipment numbers for Compaq and HP and compare them in 2001 and 2002, you end up with a 6% decline year to year. Dell for the same period ratcheted server shipments up 15%. While Dell still is in the minor leagues on a server revenue basis — $3.6 billion vs. HP's $12.3 billion — Dell certainly is on a tear.

Fiorina once said in an interview: "Michael Dell is doing a superb job of driving a business model to its logical conclusion. But he is not innovating. Period. He is not an innovator. He's a distributor."

Well, that master distributor just launched a line of printing products, a traditional profit engine for HP. It will be interesting to see if and how this will squeeze HP.

Sun, on the other hand, is getting squeezed on multiple sides: Sales for 2002 were down 32% to $12 billion, and the company reported a loss of $587 million. Rocked hard by the dot-com and telecom implosions over the last few years, the company crept away from those wrecks only to

Fast growth

Forgent Networks and Level 3 close 2002 as the fastest growing NW200 companies.

The five fastest-growing NW200 companies

Company	Revenue ($M) FY02	'01-'02 revenue % Δ	Rank 2002
Forgent Networks	$59	118%	187
Riverstone Networks	$211	114%	116
Level 3	$3,148	105%	34
Altiris	$63	82%	179
Nextel Partners	$671	78%	71
With revenue of more than $500 million			
Level 3	$3,148	118%	34
Nextel Partners	$671	78%	71
Allegiance Telecom	$771	49%	69
SunGard Data Systems	$2,593	31%	37
Comcast	$12,460	27%	18

In 2002, the Network World 200 saw its second consecutive year of revenue drop-off — this time, revenues were down 12% from last year to $785 billion. Still, not all NW200 companies posted lower revenue. Some, such as growth-list-toppers Forgent Networks and Level 3 Communications, bumped up revenue by more than 100% in 2002.

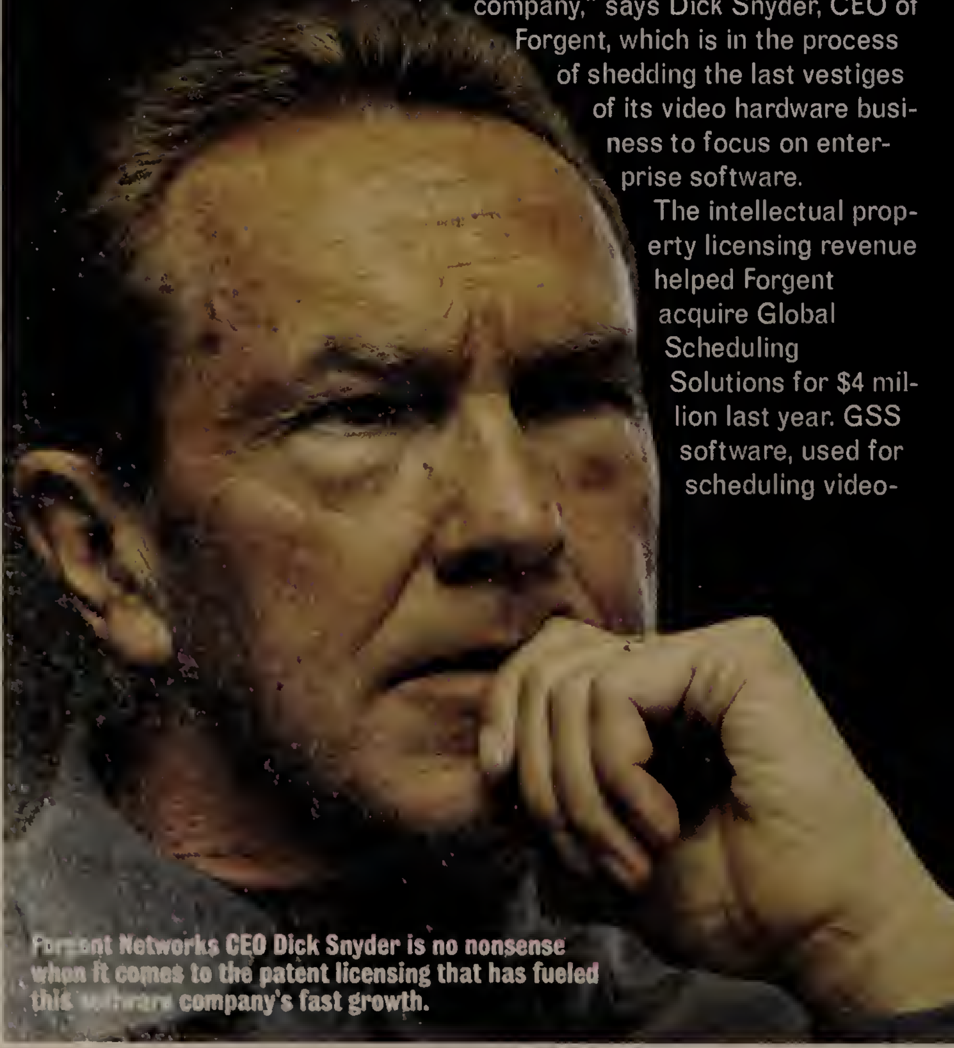
Growth through licensing

Forgent, a vendor of video management and scheduling software, grew fastest overall, with revenue increasing from $26.9 million in 2001 to $58.6 million in 2002. The 118% growth spike came on the back of a nugget Forgent mined from its portfolio of more than 40 patents. The company owns U.S. patent 4,698,672, which covers a JPEG compression technology widely used in devices such as digital cameras, PDAs, mobile phones and Web browsers.

In a highly contentious decision, Forgent began licensing the technology in June, adding $40 million to its revenue stream.

"Intellectual property licensing has been one of the key pieces of the company," says Dick Snyder, CEO of Forgent, which is in the process of shedding the last vestiges of its video hardware business to focus on enterprise software.

The intellectual property licensing revenue helped Forgent acquire Global Scheduling Solutions for $4 million last year. GSS software, used for scheduling videoconferences, complements Forgent's Video Network Platform software for managing networked videoconferencing devices.



Forgent Networks CEO Dick Snyder is no nonsense when it comes to the patent licensing that has fueled this software company's fast growth.

CHRIS COVATTA

Revenue from intellectual property licensing will continue to fund the software business, Snyder says. That business is averaging $1 million in revenue per quarter and growing on average 20% quarter over quarter, he adds.

Growth through acquisition

Carrier Level 3 closed 2002 in an auspicious position with a 105% increase in revenue compared with 2001, bringing its year-end revenue to $3.1 billion. While the increase is the largest of any NW200 company with revenue of more than $500 million, it's not likely to repeat in 2003.

The majority of Level 3's additional revenue stems from two acquisitions the carrier made last year, not in its core services business. On the services side, Level 3's revenue was down by 15%, from $1.3 billion in 2001 to $1.1 billion in 2002. "Still, it's important to focus on Level 3's significant revenue growth overall," says Seth Libby, a senior analyst at The Yankee Group.

Level 3 acquired Corporate Software and Software Spectrum, which resell business software from vendors such as Microsoft, IBM/Lotus and Symantec. The companies now operate as a wholly owned Level 3 subsidiary under the Software Spectrum name.

As long as Level 3's investors are happy, the company is buying itself time in avoiding Chapter 11 bankruptcy, Libby says. And investors apparently still believe in Level 3's viability. In July 2002, despite carrying $6.1 billion in long-term debt, Level 3 received $500 million in capital from three investors including Warren Buffett's Berkshire Hathaway.

With the infusion, Level 3 acquired troubled ISP Genuity. The deal closed this year with Level 3 paying $62 million for the ISP, which is in bankruptcy proceedings, in addition to absorbing some operating expenses. With this acquisition, Level 3 expands its footprint while taking a competitor out of the market, Libby says.

Level 3 is "not out of the woods yet," as Libby notes, but it does appear to be on the road to recovery.

— John Fontana and Denise Pappalardo

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face growing acceptance of Linux on powerful Intel-based boxes as an alternative to its costly servers.

"Market conditions are still tough, but we expect opportunities in network computing to grow long-term," CEO Scott McNealy wrote in Sun's annual report. "Wireless phones, pagers, PDAs, game players, cars, radio-frequency ID tags, embedded controllers, security cameras, environmental sensors — all these things, and more, are being connected to the network. The sheer volume of data and transactions will create demand for new and more powerful computing architectures."

Telecom's black eye

Counting on future demand is, of course, what got the whole telecom sector in trouble a few years ago. And trouble still dogs this market.

Let's see, we had accounting scandals at WorldCom and Qwest; the reorganization of AT&T; new top management at WorldCom, Qwest, AT&T and, more recently, Sprint and BellSouth; the shift of major assets such as Genuity to Level 3; and the bankruptcy of WorldCom.

What a mess.

Although the poster child, WorldCom, hopes to get acceptance for its reorganization plan soon, its emergence from bankruptcy later this year might cause even more market disruption. After all, the company — now called MCI — will be shorn of debt and aggressively trying to regain share, conditions that might lead to a damaging price war.

Combine that with efforts by the regional Bell operating companies to steal long-distance share and core regulatory shifts, and you have a potent recipe for more turmoil in 2003.

The Big Kahuna that stands to gain the most in this environment is Verizon, the new king of the telecom heap. At $68 billion, Verizon is now $30 billion larger than the once-almighty AT&T.

A legion of equipment suppliers hope these and the other telecom players can settle down soon. They are all in a world of hurt, starting with the biggest players. Lucent's revenue was down 42% in 2002 to $12 billion, dropping the company to No. 19 on the list. At its height in 1999, Lucent was No. 5 on the NW200 with three times the sales — $39 billion.

Nortel's revenue was off a similar amount, 40%, to $11 billion, and it reported a loss of $3.5 billion.

Others fared even worse. Sycamore Networks, which makes optical network products, saw sales plummet 83% to $65 million, dropping it from 96 on the NW200 to 176. Sonus Networks dropped from 130 to 180, and Corvis dropped off the list altogether, going from 126 last year to 222.

Kevin Mitchell, directing analyst with Infonetics Research, says these companies won't get much relief this year. "For [capital expenses] to ratchet up, top-line revenue has to grow," he says. "That's hard to envision in the next few years because of line losses to broadband and cellular."

The 2003 outlook for the whole NW200 is rather glum. But one can only hope that some of the industry high shenanigans are behind us. ■

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NW200 companies A to Z

2002 rank	Company
46	3Com
193	ACT Teleconferencing
143	Actuate
82	Adaptec
59	ADC Telecommunications
55	Adobe Systems
90	Adtran
163	Agile Software
125	Akamai Technologies
69	Allegiance Telecom
24	Alltel
179	Altiris
52	American Power Conversion
38	Anixter
5	AOL Time Warner
25	Apple
111	Ariba
139	Ascential Software
85	Aspect Communications
6	AT&T
15	AT&T Wireless Services
30	Avaya
102	Avocent
62	BEA Systems
67	Belden
12	BellSouth
173	BindView
191	Blue Coat Systems
53	BMC Software
106	Borland Software
137	Broadvision
74	Brocade
168	Brooktrout
177	Caldera International
81	Check Point
167	Chordiant Software
87	Ciena
14	Cisco
76	Citrix Systems
77	Cognos
18	Comcast
145	Commerce One
73	CommScope
36	Computer Associates
115	Computer Network Technology
20	Computer Sciences
42	Compuware
70	Comverse Technology
151	Concerto Software
154	Concord Communications
189	Corio
29	Cox Communications
156	Critical Path
157	Datalink
7	Dell
149	Digi International
169	Docucorp
112	Documentum
196	Dot Hill Systems
197	DSL.net
158	E.piphany
47	EarthLink
138	EasyLink Services
13	Electronic Data Systems
28	EMC
104	Emulex
83	Enterasys Networks
147	Entrust
127	Epicor Software
164	Equinix
131	Exabyte
79	Extreme Networks
144	F5 Networks
89	FileNet
123	Finisar
187	Forgent Networks
95	Foundry Networks
32	Gateway
108	Handspring
41	Harris
2	HP
119	Hummingbird
100	Hypercom
1	IBM
72	Infonet Services
140	Inktomi
113	Inrange Technologies
9	Intel
195	Interactive Intelligence
148	Interland
132	Internap Network Services
107	Internet Security Systems
86	Inter-Tel
114	Intervoice-Brite
133	Interwoven
64	J.D. Edwards
194	j2 Global Communications
75	Juniper
161	Kana Software
200	Keynote Systems
188	Lantronix
199	Latitude Communications
80	Lawson Software
101	Legato Systems
34	Level 3 Communications
31	Lexmark
19	Lucent
93	Macromedia
94	Manugistics Group
33	Maxtor
92	McData
61	McLeodUSA
142	Mercator Software
84	Mercury Interactive
129	Micromuse
8	Microsoft
10	Motorola
105	MRV Communications
136	MTI Technology
186	NaviSite
27	NCR
172	Netegrity
97	NetIQ
175	NetManage
178	Netopia
160	NetScout Systems
130	NetScreen Technologies
68	Network Appliance
63	Network Associates
150	Network Equipment Technologies
23	Nextel Communications
71	Nextel Partners
21	Nortel
181	Novadigm
56	Novell
171	Onyx Software
121	Open Text
198	Opnet Technologies
190	Opsware
22	Oracle
192	Packeteer
60	Palm
141	Paradyne Networks
40	PeopleSoft
49	Perot Systems
170	Pivotal
159	Plumtree Software
78	Polycom
124	Printronix
99	Progress Software
126	Proxim
91	Ptek Holdings
88	Qlogic
35	Qualcomm
57	Quantum
103	Quest Software
16	Qwest
134	Rainbow Technologies
185	Raindance Communications
118	RealNetworks
162	Red Hat
135	Redback Networks
96	Research in Motion
116	Riverstone Networks
110	RSA Security
109	Savvis Communications
4	SBC
43	Scientific-Atlanta
174	Secure Computing
122	SeeBeyond Technology
44	Siebel Systems
165	Sierra Wireless
48	Silicon Graphics
146	SonicWall
180	Sonus Networks
184	SpectraLink
11	Sprint (consolidated)
120	Standard Microsystems
39	Storage Technology
153	StorageNetworks
17	Sun
37	SunGard Data Systems
66	Sybase
176	Sycamore Networks
58	Symantec
50	Symbol Technologies
65	Tektronix
51	Tellabs
98	Tibco Software
26	Unisys
54	VeriSign
45	Veritas Software
155	Verity
3	Verizon
182	Visual Networks
152	Vitria Technology
166	WatchGuard Technologies
128	WebEx Communications
117	webMethods
183	Websense

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Information Lifecycle Management Practices

Path Management moving up the food chain?

— By Steve Kenniston

Ensuring that data is available whenever users need it has been at the forefront of IT requirements for some time now. But all data is not created equal. What's important today may be of limited use 30 days or even a few hours from now. Other data may be extremely important on the day a financial analyst runs a month-end report, but far less so the rest of the time.

These constantly changing data availability requirements create a problem because companies can't afford to keep 100% of their data in a high-end, high-availability storage system. Some data has to be stored on less-expensive storage systems that are somewhat less readily accessible. The key, then, is matching the right data asset with the right storage asset, and to do so automatically.

Information Lifecycle Management (ILM) is a discipline for achieving this kind of data management nirvana. ILM is making its way into the top 10 buzzwords in the storage industry and for good reason: It touches many business-critical areas of storage management necessary for the enterprise to remain competitive while controlling costs.

There are a number of drivers behind the increasing demand for ILM solutions, including:

- Data growth of 50% or more per year in most industries
- Increased demand for high-availability of data, leading to a need for better classification of data types
- More demanding data retention, compliance and security requirements, including those mandated by government regulations

New storage management tools are making it easier for IT to keep more data online at the right price. Hardware technologies, such as inexpensive ATA arrays, are combining with software tools, such as Automated Resource Management (ARM) and Automated Data Migration (ADM) products, to help users manage and optimize their logical assets.

Another core enabling technology for information availability that cannot be overlooked is path management.

Path management is one of the three fundamental components of data management, along with file systems and volume management. Server vendors include some form of file system with the server operating system—usually UFS in the UNIX world and FAT or NTFS in the Windows world. These same vendors typically provide volume management as well, to help users determine the most appropriate volumes for various types of data to reside in.

The products that come as a part of the operating system do the job but are limited in scope and function. Typical server file systems are limited in scale, for example, while volume management tools restrict the number of available volumes. For those that want more advanced function, point products are available from a few vendors.

New and innovative storage management tools are making life a little easier for IT to keep more data online at the right price.

Path management tools, meanwhile, provide a way to let IT manage the physical data path a user follows take to get at data, as well as where the data is stored at various times in its lifecycle. To accomplish all that, path management tools must work in conjunction with file systems and volume managers.

There is an evolution taking place, however, toward a more strategic view of IT storage infrastructure, rather than one built around point products. We are seeing leading IT shops migrating from point products to seamlessly interoperable, integrated solutions with one set of management tools. These products create the foundation for ILM.

On the Path to ILM

Because the value of information fluctuates over time, path management is emerging as a key underpinning of any ILM strategy. Few firms are willing to move on-line data to a less expensive storage repository if there is only a single path available to that data. Path management tools provide more options for how to get at data and where it should reside.

That capability is crucial to realizing the goal of ILM, which is to put the right data asset on the right storage asset, automatically, quickly and efficiently, in order to maximize expensive storage assets and free up valuable IT resources. True ILM enables companies to cost-effectively manage data while taking into account performance and availability requirements at discreet times in the data's lifecycle. As availability and performance requirements change, data must be dynamically migrated to the most appropriate storage platform, whether that is a high-performance near-line solution or a long-term archive. The key point is that the data is always available.

Path management software is already mature as a standalone technology, as are file systems and volume management tools. What is exciting, however, is the potential power of a solution that combines path management and enabling technologies like file systems and volume management into an integrated whole. It all starts with finding end-to-end path management solutions that enable IT to leverage data placement, access and mobility.

Several vendors are migrating path management solutions from the host into the storage fabric. Fabric platforms will allow technologies such as volume management, data path failover management and even replication to live closer to the array, managing the mobility and availability of information.

IT managers will soon have new doors open to them, with solutions available from vendors apart from the traditional server and storage software companies. These new deployment options – incorporating path management tools into true ILM solutions – will make it easier to manage high-availability storage networks, enabling organizations to increase business resiliency while containing costs.

For more information on Network Storage Solutions and the Enterprise Storage Group, go to: www.enterprisestoragegroup.com

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Rank			2002 revenue			2002 profit/loss					2002 market cap $M*	Cash & invest $M	Ticker	Number of employees		Rev. per employee $M	Year inc.	FY ends
2002	2001	Company Name	$M	'00-'01 % Δ	'98-'02 CAGR	$M	'01-'02 % Δ	% of rev.	Profit rank	'98-'02 CAGR				2002	'01-'02 % Δ			
1	1	IBM	81,186	-2%	0%	3,579	-54%	4%	4	-11%	146,230	5,975.0	IBM	325,000	2%	249,803	1911	Dec
2	5	HP	72,346	-11%	9%	(928)	n/m	n/m	189	n/m	53,450	11,429.0	HPQ	141,000	64%	513,092	1947	Oct
3	2	Verizon	67,625	1%	3%	4,079	949%	6%	3	-4%	103,050	3,480.0	VZ	229,500	-7%	294,662	2000	Dec
4	4	SBC	43,138	-6%	-1%	5,653	-19%	13%	2	-6%	71,850	3,567.0	SBC	175,400	-9%	245,941	1983	Dec
5	6	AOL Time Warner	41,065	7%	60%	(98,696)	n/m	n/m	200	n/m	51,180	6,868.0	AOL	91513	2%	448,734	2001	Dec
6	3	AT&T	37,827	-10%	-5%	(13,082)	n/m	n/m	198	n/m	12,960	8,014.0	T	72,000	-39%	525,375	1885	Dec
7	9	Dell	31,168	-2%	20%	1,246	-43%	4%	10	6%	7,423	3,914.0	DELL	34,600	-14%	900,809	1984	Jan
8	13	Microsoft	28,365	9%	13%	7,829	7%	28%	1	12%	284,340	38,652.0	MSFT	50500	6%	561,683	1975	Jun
9	11	Intel	26,764	1%	0%	3,117	141%	12%	5	-12%	123,680	10,786.0	INTC	78,700	-6%	340,076	1968	Dec
10	10	Motorola	26,679	-11%	-2%	(2,485)	n/m	n/m	194	n/m	19,560	6,566.0	MOT	97,000	-13%	275,041	1947	Dec
11	12	Sprint (consolidated)	26,634	4%	10%	630	n/m	2%	13	97%	14,840	1,035.0	NA	72200	-14%	368,892	1938	Dec
12	14	BellSouth	22,440	-7%	-1%	1,423	-45%	6%	8	-17%	42,580	2,482.0	BLS	77,000	-12%	291,429	1983	Dec
13	16	Electronic Data Systems	21,502	2%	5%	1,116	-18%	5%	11	8%	8,410	1,890.0	EDS	137,000	-4%	156,949	1996	Dec
14	15	Cisco	18,915	-15%	17%	1,893	n/m	10%	7	7%	98,850	12,656.0	CSCO	36,000	-5%	525,417	1984	Jul
15	21	AT&T Wireless Services	15,631	15%	24%	(2,324)	n/m	n/m	193	n/m	17,800	2,353.0	AWE	32,000	-3%	488,469	1987	Dec
16	18	Qwest	15,487	-7%	6%	(35,913)	n/m	n/m	199	n/m	6,700	2,288.0	Q	50,788	-17%	304,934	1995	Dec
17	19	Sun	12,496	-32%	5%	(587)	n/m	n/m	181	n/m	11,890	4,909.0	SUNW	39,400	-10%	317,157	1982	Jun
18		Comcast	12,460	27%	19%	(274)	n/m	n/m	170	n/m	2,686	4,015.0	CMCSK	u/a	u/a	u/a	u/a	Dec
19	17	Lucent	12,321	-42%	-16%	(11,753)	n/m	n/m	197	n/m	6,340	4,420.0	LU	47,000	-39%	262,149	1995	Sep
20	23	Computer Sciences	11,426	9%	12%	344	48%	3%	17	6%	6,040	149.1	CSC	67,000	-1%	170,537	1959	Mar
21	20	Nortel	10,560	-40%	-8%	(3,585)	n/m	n/m	195	n/m	8,660	3,861.0	NT	36,960	-31%	285,714	1895	Dec
22	22	Oracle	9,673	-12%	6%	2,224	-13%	23%	6	22%	59,800	5,841.2	ORCL	42,006	-2%	230,267	1977	May
23	25	Nextel Communications	8,721	24%	31%	1,386	n/m	16%	9	n/m	13,020	2,686.0	NXTL	15,000	-12%	581,400	1987	Dec
24	26	Alltel	7,983	6%	9%	924	-13%	12%	12	12%	14,400	155.5	AT	u/a	u/a	u/a	1960	Dec
25	32	Apple	5,742	7%	-1%	65	n/m	1%	33	-27%	5,410	4,337.0	AAPL	10,211	6%	562,335	1977	Sep
26	30	Unisys	5,607	-7%	-5%	223	n/m	4%	20	-10%	3,260	301.8	UIS	36,400	-6%	154,049	1986	Dec
27	31	NCR	5,585	-6%	-3%	(220)	n/m	n/m	164	n/m	1,940	526.0	NCR	29,700	-2%	188,047	1884	Dec
28	27	EMC	5,438	-23%	6%	(119)	n/m	n/m	151	n/m	16,300	2,551.3	EMC	17,400	-13%	312,549	1979	Dec
29		Cox Communications	5,039	18%	24%	(274)	n/m	n/m	171	n/m	20,020	228.7	COX	u/a	u/a	u/a	u/a	Dec
30	28	Avaya	4,956	-27%	-9%	(666)	n/m	n/m	185	n/m	875	597.0	AV	18,800	-18%	263,617	2000	Sep
31	34	Lexmark	4,356	6%	8%	367	34%	8%	15	9%	8,320	497.7	LXK	12,100	-5%	360,033	1991	Dec
32	29	Gateway	4,171	-31%	-11%	(298)	n/m	n/m	173	n/m	778	1,066.7	GTW	11,200	-20%	372,438	1985	Dec
33	36	Maxtor	3,780	0%	9%	(334)	n/m	n/m	176	n/m	1,430	394.0	MXO	12,449	27%	303,600	1982	Dec
34	54	Level 3 Communications	3,148	105%	52%	(858)	n/m	n/m	188	n/m	2,110	1,142.0	LVLT	u/a	u/a	u/a	1985	Dec
35	39	Qualcomm	3,040	13%	-2%	360	n/m	12%	16	27%	30,930	2,794.6	QCOM	8,100	25%	375,259	1985	Sep
36	33	Computer Associates	2,964	-29%	-9%	(1,102)	n/m	n/m	190	n/m	8,400	1,180.0	CA	16,600	-9%	178,554	1974	Mar
37	49	SunGard Data Systems	2,593	31%	17%	326	32%	13%	18	22%	6,360	439.7	SDS	9,000	3%	288,137	1982	Dec
38	37	Anixter	2,520	-20%	1%	43	42%	2%	37	-8%	937	19.1	AXE	5,000	2%	504,020	1967	Dec
39	46	Storage Technology	2,040	0%	-2%	110	64%	5%	24	-11%	2,470	657.6	STK	7,100	-9%	287,268	1969	Dec
40	44	PeopleSoft	1,949	-8%	6%	183	-5%	9%	22	5%	5,270	1,907.5	PSFT	8,293	-2%	235,005	1987	Dec
41	48	Harris	1,876	-4%	-14%	83	286%	4%	28	-9%	1,970	278.4	HRS	9,700	-4%	193,381	1895	Jun
42	47	Compuware	1,729	-14%	9%	(245)	n/m	n/m	167	n/m	1,530	366.8	CPWR	10,164	-23%	170,061	1973	Mar
43	40	Scientific-Atlanta	1,671	-33%	7%	104	-69%	6%	25	5%	2,090	731.2	SFA	5,870	-30%	284,685	1951	Jun
44	45	Siebel Systems	1,635	-22%	31%	(36)	n/m	n/m	113	n/m	4,340	2,161.6	SEBL	5,909	-20%	276,747	1993	Dec
45	56	Veritas Software	1,506	1%	48%	57	n/m	4%	35	2%	7,540	2,241.3	VRTS	u/a	u/a	u/a	1989	Dec
46	38	3Com	1,478	-48%	-23%	(596)	n/m	n/m	183	n/m	1,590	1,382.0	COMS	4,615	-43%	320,238	1979	May
47	60	EarthLink	1,357	9%	50%	148	-57%	11%	23	n/m	866	0.0	ELNK	u/a	u/a	u/a	1994	Dec
48	50	Silicon Graphics	1,341	-28%	-15%	(46)	n/m	n/m	122	n/m	287	218.2	SGI	4,443	-25%	301,913	1982	Jun
49	65	Perot Systems	1,332	11%	6%	78	n/m	6%	30	14%	1,120	212.9	PER	9,100	12%	146,385	1988	Dec
50	57	Symbol Technologies	1,320	-9%	6%	11	n/m	1%	54	-35%	2,250	76.1	SBL	u/a	u/a	u/a	1973	Dec
51	43	Tellabs	1,317	-40%	-5%	(313)	n/m	n/m	175	n/m	2,610	1,019.2	TLAB	u/a	u/a	u/a	1975	Dec
52	58	American Power Conversion	1,300	-7%	3%	82	-28%	6%	29	-11%	3,200	640.3	APCC	u/a	u/a	u/a	1981	Dec
53	55	BMC Software	1,289	-15%	12%	(184)	n/m	n/m	158	n/m	3,870	355.8	BMC	6,335	-14%	203,457	1980	Mar
54	71	VeriSign	1,222	24%	99%	(4,961)	n/m	n/m	196	n/m	2,130	403.9	VRSN	3,100	-5%	394,097	1995	Dec
55	62	Adobe Systems	1,165	-5%	5%	191	-7%	16%	21	13%	7,410	617.7	ADBE	3,341	10%	348,638	1982	Nov
56	68	Novell	1,134	8%	1%	(247)	n/m	n/m	168	n/m	866	635.9	NOVL	6524	0%	173,866	1983	Oct
57	59	Quantum	1,088	-23%	-2%	43	-74%	4%	38	-24%	611	344.5	DSS	3,100	3%	350,903	1980	Mar
58	76	Symantec	1,071	26%	15%	(28)	n/m	n/m	102	n/m	6,290	1,375.1	SYMC	3,900	3%	274,718	1982	Mar
59	41	ADC Telecommunications	1,048	-56%	-5%	(1,145)	n/m	n/m	191	n/m	2,090	279.4	ADCT	7,600	-37%	137,855	1953	Oct
60	53	Palm	1,031	-34%	31%	(82)	n/m	n/m	134	n/m	304	296.5	PALM	1,171	-11%	880,300	1992	May
61	51	McLeodUSA	992	-22%	10%	582	n/m	59%	14	n/m	166	170.6	MCLD	3,719	-56%	266,765	1991	Dec
62	79	BEA Systems	976	19%	44%	(36)	n/m	n/m	114	n/m	4,710	1,027.2	BEAS	3,116	4%	313,190	1995	Jan
63	77	Network Associates	942	16%	-1%	90	n/m	10%	27	20%	2,510	1,013.7	NET	u/a	u/a	u/a	1989	Dec
64	75	J.D. Edwards	905	1%	-1%	46	n/m	5%	36	-9%	1,490	303.1	JDEC	4,954	5%	182,580	1977	Oct
65	61	Tektronix	843	-32%	-9%	33	-77%	4%	41	-2%	1,560	456.6	TEK	4,301	-12%	196,071	1946	May
66	73	Sybase	830	-11%	-1%	(95)	n/m	n/m	143	n/m	1,350	294.3	SY	4,200	-9%	197,595	1984	Dec
67	72	Belden	813	-16%	2%	-16	n/m	n/m	92	n/m	317	19.4	BWC	4,700	-6%	173,053	1902	Dec

*Captured March 18

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Rank			2002 revenue			2002 profit/loss					2002 market cap $M*	Cash & invest $M	Ticker	Number of employees		Rev. per employee $M	Year inc.	FY ends
2002	2001	Company Name	$M	'00-'01 % Δ	'98-'02 CAGR	$M	'01-'02 % Δ	% of rev.	Profit rank	'98-'02 CAGR				2002	'01-'02 % Δ			
68	69	Network Appliance	798	-21%	37%	3	-96%	0%	63	-32%	4,210	454.1	NTAP	2,280	-5%	350,175	1992	Apr
69		Allegiance Telecom	771	49%	139%	(573)	n/m	n/m	180	n/m	42	284.3	ALGX	3,081.0	-26%	250,238	1997	Dec
70	63	Comverse Technology	736	-42%	120%	(62)	n/m	n/m	126	n/m	2,260	1,422.8	CMVT	5,650	-11%	130,246	1984	Jan
71		Nextel Partners	671	78%	163%	(283)	n/m	n/m	172	n/m	1,280	195.0	NXTP	2,400	26%	279,458	1998	Dec
72	80	Infonet Services	646	-2%	17%	(13)	n/m	n/m	89	n/m	598	147.2	IN	978	4%	660,327	1988	Mar
73	79	CommScope	599	-19%	1%	(67)	n/m	n/m	129	n/m	471	120.1	CTV	u/a	u/a	u/a	1953	Dec
74	85	Brocade	562	10%	88%	60	1998%	11%	34	n/m	1,140	567.5	BRCD	1,332	25%	422,222	1995	Oct
75	74	Juniper	547	-38%	170%	(120)	n/m	n/m	152	n/m	3,430	578.5	JNPR	1,542	26%	354,410	1996	Dec
76	81	Citrix Systems	527	-11%	16%	94	39%	18%	26	9%	2,410	219.9	CTXS	1,800	-4%	293,027	1989	Dec
77	86	Cognos	491	-1%	15%	36	-44%	7%	40	2%	2,180	314.5	COGN	2,600	-4%	188,962	1969	Feb
78	95	Polycom	466	22%	29%	27	n/m	6%	42	13%	862	193.9	PLCM	1,250	-1%	372,767	1990	Dec
79	87	Extreme Networks	442	-10%	80%	(184)	n/m	n/m	157	n/m	443	236.5	EXTR	987	2%	447,426	1996	Jun
80		Lawson Software	428	9%	16%	8	-43%	2%	55	6%	442	73.1	LWSN	1,944	-10%	220,319	1975	May
81	84	Check Point Software	427	-19%	25%	255	-21%	60%	19	30%	3,850	1,314.8	CHKP	1,203	2%	354,937	1993	Dec
82	82	Adaptec	419	-28%	-16%	(196)	n/m	n/m	160	n/m	714	803.7	ADPT	1,713	-12%	244,454	1981	Mar
83		Enterasys Networks	415	-57%	n/m	(704)	n/m	n/m	186	n/m	404	179.7	ETS	2,300	-12%	180,565	1983	Dec
84	98	Mercury Interactive	400	11%	27%	65	91%	16%	32	24%	2,860	527.2	MERQ	1822	14%	219,594	1989	Dec
85	89	Aspect Communications	396	-11%	-5%	(108)	n/m	n/m	148	n/m	181	146.1	ASPT	u/a	u/a	u/a	1985	Dec
86	94	Inter-Tel	382	-1%	7%	39	196%	10%	39	34%	400	125.8	INTL	u/a	u/a	u/a	1969	Dec
87	52	Ciena	361	-77%	-7%	(1,598)	n/m	n/m	192	n/m	2,160	1,507.6	CIEN	2,118	-44%	170,538	1992	Oct
88		Qlogic	350	-4%	31%	71	3%	20%	31	59%	3,750	492.5	QLGC	668	7%	523,488	1992	Mar
89	101	FileNet	347	4%	2%	8	n/m	2%	56	53%	419	159.3	FILE	u/a	u/a	u/a	1982	Dec
90	93	Adtran	346	-11%	4%	25	43%	7%	43	-9%	1,420	144.8	ADTN	1,522	-6%	227,135	1985	Dec
91	90	Ptek Holdings	341	3%	-5%	2	n/m	1%	67	n/m	218	69.4	PTEK	u/a	u/a	u/a	1991	Dec
92	99	McData	328	-5%	55%	(10)	n/m	n/m	84	n/m	1,050	229.7	MCDTA	u/a	u/a	u/a	1997	Jan
93		Macromedia	325	-17%	23%	(309)	n/m	n/m	174	n/m	808	162.0	MACR	1405	-25%	231,174	1992	Mar
94	107	Manugistics Group	310	16%	11%	(115)	n/m	n/m	149	n/m	194	228.8	MANU	1384	-5%	224,061	1986	Feb
95	103	Foundry Networks	301	-3%	78%	23	676%	7%	44	n/m	985	326.5	FDRY	u/a	u/a	u/a	1996	Dec
96	116	Research in Motion	294	33%	66%	(29)	n/m	n/m	103	n/m	1,080	644.6	RIMM	1950	55%	150,821	1984	Feb
97	132	NetIQ	278	67%	108%	(731)	n/m	n/m	187	n/m	675	475.9	NTIQ	1,253	15%	222,058	1995	Jun
98	102	Tibco Software	273	-14%	39%	(95)	n/m	n/m	142	n/m	967	637.8	TIBX	1,030	2%	265,437	1996	Nov
99	108	Progress Software	273	4%	3%	21	17%	8%	45	-2%	567	117.2	PRGS	1,291	-7%	211,559	1981	Nov
100	104	Hypercom	272	3%	1%	(61)	n/m	n/m	125	n/m	203	23.1	HYC	1209	0%	225,227	1987	Dec
101	139	Legato Systems	262	8%	9%	(229)	n/m	n/m	165	n/m	653	70.0	LGTO	1,577	18%	166,075	1988	Dec
102		Avocent	261	2%	28%	11	n/m	4%	53	-7%	1,090	169.3	AVCT	u/a	u/a	u/a	2000	Dec
103	111	Quest Software	258	5%	49%	11	n/m	4%	52	36%	876	92.1	QSFT	1,800	10%	143,556	1987	Dec
104	112	Emulex	255	4%	34%	(96)	n/m	n/m	146	n/m	1,740	282.6	ELX	348	9%	731,897	1979	Jun
105	100	MRV Communications	253	-24%	-1%	(480)	n/m	n/m	178	n/m	114	112.4	MRVC	u/a	u/a	u/a	1988	Dec
106		Borland Software	245	10%	5%	17	-25%	7%	46	16%	675	296.2	BORL	u/a	u/a	u/a	1983	Dec
107	115	Internet Security Systems	243	9%	47%	2	n/m	1%	68	0%	553	202.3	ISSX	1,200	0%	202,750	1994	Dec
108	97	Handspring	241	-35%	n/m	(92)	n/m	n/m	139	n/m	107	100.8	HAND	383	-10%	628,332	1998	Jun
109	113	Savvis Communications	236	-3%	77%	14	n/m	6%	51	n/m	40	32.2	SVVS	825	46%	286,061	1995	Dec
110	105	RSA Security	232	-18%	6%	(97)	n/m	n/m	147	n/m	456	103.0	RSAS	1,000	-18%	232,100	1986	Dec
111	91	Ariba	229	-43%	94%	(661)	n/m	n/m	184	n/m	842	245.3	ARBAE	834	-26%	274,820	1996	Sep
112	129	Documentum	227	21%	13%	(1)	n/m	n/m	71	n/m	590	195.1	DCTM	1,155	22%	196,456	1990	Dec
113	109	Inrange Technologies	224	-14%	0%	(14)	n/m	n/m	91	n/m	159	14.8	INRG	785	-25%	284,841	1968	Dec
114	106	Intervoice-Brite	212	-23%	16%	(45)	n/m	n/m	121	n/m	57	17.6	INTV	959	-20%	220,684	1983	Feb
115	128	Computer Network Technology	212	13%	10%	(38)	n/m	n/m	119	n/m	188	209.4	CMNT	u/a	u/a	u/a	1983	Jan
116		Riverstone Networks	211	114%	362%	(31)	n/m	n/m	106	n/m	208	283.9	RSTN	525	11%	401,524	2000	Feb
117	121	webMethods	196	-3%	115%	(83)	n/m	n/m	135	n/m	506	211.8	WEBM	888	-13%	220,721	1996	Mar
118	124	RealNetworks	183	-3%	22%	(38)	n/m	n/m	118	n/m	670	309.1	RNWK	696	-14%	262,470	1994	Dec
119	119	Hummingbird	180	-13%	7%	(3)	n/m	n/m	72	n/m	300	119.7	HUMC	1,300	0%	138,769	1984	Sep
120	133	Standard Microsystems	159	-3%	2%	6	-78%	4%	58	n/m	259	126.7	SMSC	428	-7%	372,196	1971	Feb
121	138	Open Text	153	3%	27%	17	55%	11%	47	58%	547	109.9	OTEX	980	-15%	155,612	1991	Jun
122	127	SeeBeyond Technology	151	-21%	32%	(24)	n/m	n/m	98	n/m	216	94.1	SBYN	u/a	u/a	u/a	1989	Dec
123	125	Finisar	147	-22%	46%	(219)	n/m	n/m	163	n/m	187	144.1	FNSR	1,750	130%	84,171		Apr
124	137	Printronix	147	-7%	-3%	2	n/m	2%	65	-31%	56	22.6	PTNX	922	2%	159,111	1974	Mar
125	134	Akamai Technologies	145	-11%	580%	(203)	n/m	n/m	161	n/m	169	111.3	AKAM	557	-34%	260,323	1998	Dec
126	170	Proxim	145	37%	23%	(240)	n/m	n/m	166	n/m	90	17.0	PROX	u/a	u/a	u/a	1984	Dec
127	131	Epicor Software	140	-19%	7%	(3)	n/m	n/m	73	n/m	90	31.3	EPIC	801	-18%	175,365	1987	Dec
128	171	WebEx Communications	140	72%	134%	16	n/m	12%	49	n/m	441	69.0	WEBX	u/a	u/a	u/a	1995	Dec
129	118	Micromuse	139	-35%	38%	(56)	n/m	n/m	123	n/m	430	159.3	MUSE	660	-11%	210,802	1997	Sep
130		NetScreen Technologies	138	62%	192%	(12)	n/m	n/m	87	n/m	1,370	249.9	NSCN	493	49%	280,897	1997	Sep
131	136	Exabyte	133	-16%	-14%	(29)	n/m	n/m	104	n/m	6	2.7	EXBT	u/a	u/a	u/a	1996	Dec
132	154	Internap Network Services	133	13%	131%	(72)	n/m	n/m	132	n/m	72	25.2	INAP	u/a	u/a	u/a		Dec
133	120	Interwoven	127	-38%	100%	(149)	n/m	n/m	155	n/m	212	181.7	IWOV	608	-34%	208,605	1995	Dec
134	143	Rainbow Technologies	126	3%	3%	(38)	n/m	n/m	117	n/m	265	51.2	RNBO	500	-9%	252,200	1984	Dec

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Rank			2002 revenue			2002 profit/loss					2002			Number of employees		Rev. per		
2002	2001	Company Name	$M	'00-'01 % Δ	'98-'02 CAGR	$M	'01-'02 % Δ	% of rev.	Profit rank	'98-'02 CAGR	market cap $M*	Cash & invest $M	Ticker	2002	'01-'02 % Δ	employee $M	Year inc.	FY ends
135	114	Redback Networks	126	-45%	69%	(187)	n/m	n/m	159	n/m	108	117.8	RBAK	596	-27%	210,738	1996	Dec
136	135	MTI Technology	118	-27%	-10%	(60)	n/m	n/m	124	n/m	30	8.4	MTIC	392	-29%	300,765	1981	Mar
137	110	Broadvision	116	-53%	18%	(171)	n/m	n/m	156	n/m	133	101.9	BVSN	u/a	u/a	u/a	1993	Dec
138	150	EasyLink Services	114	-8%	138%	(86)	n/m	n/m	136	n/m	10	9.6	EASY	u/a	u/a	u/a	1990	Dec
139	88	Ascential Software	113	-77%	-31%	(64)	n/m	n/m	127	n/m	748	504.8	ASCL	635	-27%	177,953	1986	Dec
140	123	Inktomi	113	-43%	41%	(501)	n/m	n/m	179	n/m	269	45.4	INKT	405	-48%	278,272	1996	Sep
141	140	Paradyne Networks	112	-23%	-11%	(17)	n/m	n/m	93	n/m	51	47.0	PDYN	460	-18%	244,130	1999	Dec
142	147	Mercator Software	112	-13%	20%	(29)	n/m	n/m	105	n/m	53	29.9	MCTR	441	-28%	253,741	1985	Dec
143	148	Actuate	109	-13%	38%	(26)	n/m	n/m	101	n/m	80	44.9	ACTU	510	-12%	214,118	1993	Dec
144	158	F5 Networks	108	1%	86%	(9)	n/m	n/m	83	n/m	351	20.8	FFIV	467	-5%	231,906	1996	Sep
145	92	Commerce One	106	-74%	110%	(590)	n/m	n/m	182	n/m	53	77.3	CMRC	u/a	u/a	u/a	1994	Dec
146	156	SonicWall	103	-8%	69%	(94)	n/m	n/m	141	n/m	243	232.9	SNWL	u/a	u/a	u/a	1991	Dec
147	153	Entrust	103	-13%	16%	(18)	n/m	n/m	94	n/m	167	118.0	ENTU	705	-11%	145,674	1996	Dec
148		Interland	102	67%	-43%	(11)	n/m	n/m	85	n/m	122	94.2	INLD	745	-2%	136,376	1995	Aug
149	146	Digi International	102	-18%	-11%	(13)	n/m	n/m	88	n/m	61	58.2	DGII	407	-4%	249,474	1985	Sep
150	142	Network Equipment Technologies	102	-30%	-20%	(37)	n/m	n/m	116	n/m	129	94.9	NWK	498	-8%	203,815	1983	Mar
151	165	Concerto Software	100	6%	2%	(8)	n/m	n/m	82	n/m	65	35.1	CRTO	u/a	u/a	u/a	1981	Dec
152	144	Vitria Technology	97	-28%	66%	(91)	n/m	n/m	138	n/m	93	117.9	VITR	550	-36%	176,909	1994	Dec
153	151	StorageNetworks	95	-23%	n/m	(77)	n/m	n/m	133	n/m	94	228.8	STOR	220	-44%	431,364	1998	Dec
154	167	Concord Communications	94	7%	19%	2	n/m	2%	66	-25%	153	73.7	CCRD	465	-1%	201,720	1980	Dec
155	141	Verity	94	-35%	19%	1	-96%	1%	69	n/m	588	154.0	VRTY	432	-18%	217,130	1988	May
156	160	Critical Path	87	-16%	150%	(118)	n/m	n/m	150	n/m	69	39.1	CPTH	u/a	u/a	u/a	1997	Dec
157	149	Datalink	87	-31%	0%	(5)	n/m	n/m	76	n/m	41	10.3	DTLK	u/a	u/a	u/a	1958	Dec
158		E.piphany	84	-35%	90%	(72)	n/m	n/m	131	n/m	322	162.6	EPNY	520	-25%	161,154	1996	Dec
159		Plumtree Software	83	2%	234%	2	n/m	3%	64	n/m	114	65.3	PLUM	u/a	u/a	u/a	u/a	Dec
160	157	NetScout Systems	82	-24%	14%	(11)	n/m	n/m	86	n/m	110	64.1	NTCT	355	-2%	231,831	1984	Mar
161		Kana Software	79	-13%	109%	(96)	n/m	n/m	145	n/m	86	32.5	KANA	u/a	u/a	u/a	1996	Dec
162	162	Red Hat	79	-2%	28%	(140)	n/m	n/m	154	n/m	1,060	287.0	RHAT	634	-14%	124,448	1993	Feb
163	168	Agile Software	78	-11%	58%	(35)	n/m	n/m	111	n/m	318	285.6	AGIL	487	6%	159,754	1996	Apr
164		Equinix	77	22%	n/m	(22)	n/m	n/m	96	n/m	32	45.6	EQIX	475	75%	162,526	1998	Dec
165	180	Sierra Wireless	77	24%	34%	(42)	n/m	n/m	120	n/m	60	34.8	SWIR	u/a	u/a	u/a	1993	Dec
166	178	WatchGuard Technologies	76	17%	46%	(32)	n/m	n/m	107	n/m	184	89.3	WGRD	331	11%	228,097	1996	Dec
167		Chordiant Software	74	-5%	43%	(32)	n/m	n/m	108	n/m	67	39.9	CHRD	u/a	u/a	u/a	1991	Dec
168	173	Brooktrout	74	-8%	-6%	(5)	n/m	n/m	75	n/m	63	41.8	BRKT	349	0%	210,602	1984	Dec
169		Docucorp	73	15%	10%	6	141%	8%	57	14%	47	13.7	DOCC	425	6%	170,824	1997	Jul
170		Pivotal	70	-28%	37%	(96)	n/m	n/m	144	n/m	22	41.2	PVTL	521	-27%	133,589	1990	Jun
171		Onyx Software	69	-30%	15%	(14)	n/m	n/m	90	n/m	48	19.3	ONXS	u/a	u/a	u/a	1994	Dec
172	169	Netegrity	69	-21%	71%	(86)	n/m	n/m	137	n/m	128	69.1	NETE	363	-25%	190,909	1986	Dec
173	175	BindView	67	-6%	12%	(24)	n/m	n/m	99	n/m	55	37.8	BVEW	525	-8%	127,619	1990	Dec
174	184	Secure Computing	66	25%	1%	(7)	n/m	n/m	79	n/m	127	18.0	SCUR	374	-6%	175,936	1989	Dec
175	172	NetManage	66	-18%	-2%	(22)	n/m	n/m	97	n/m	13	24.8	NETM	350	-26%	187,714	1990	Dec
176	96	Sycamore Networks	65	-83%	n/m	(380)	n/m	n/m	177	n/m	836	1,043.5	SCMR	445	-53%	146,517	1998	Jul
177		Caldera International	64	59%	126%	(25)	n/m	n/m	100	n/m	29	6.6	SCOX	340	-38%	188,824	u/a	Oct
178	174	Netopia	64	-17%	21%	(34)	n/m	n/m	109	n/m	31	25.0	NTPA	316	-4%	202,848	1986	Sep
179		Altiris	63	82%	n/m	0	n/m	0%	70	n/m	241	72.9	ATRS	460	56%	136,739	1996	Dec
180	130	Sonus Networks	63	-64%	n/m	(69)	n/m	n/m	130	n/m	357	111.2	SONS	361	-39%	173,407	1997	Dec
181		Novadigm	63	24%	22%	(6)	n/m	n/m	78	n/m	38	25.8	NVDM	302	15%	206,954	1992	Mar
182		Visual Networks	62	-17%	2%	3	n/m	6%	62	n/m	55	15.2	VNWK	u/a	u/a	u/a	1993	Dec
183		Websense	61	70%	55%	17	439%	27%	48	n/m	355	140.5	WBSN	324	27%	188,272	1994	Dec
184		SpectraLink	61	0%	12%	5	-23%	9%	59	21%	143	44.2	SLNK	u/a	u/a	u/a	1990	Dec
185		Raindance Communications	61	54%	146%	(3)	n/m	n/m	74	n/m	106	31.7	RNDC	219	6%	277,169	1997	Dec
186	163	NaviSite	59	-42%	71%	(122)	n/m	n/m	153	n/m	18	21.8	NAVI	198	-49%	300,000	1998	Jul
187		Forgent Networks	59	118%	15%	(6)	n/m	n/m	77	n/m	35	19.9	FORG	178	-43%	329,213	1985	Jul
188		Lantronix	58	18%	15%	(94)	n/m	n/m	140	n/m	43	33.5	LTRX	230	-13%	250,435	1989	Jun
189	187	Corio	56	9%	112%	(35)	n/m	n/m	112	n/m	44	43.9	CRIO	u/a	u/a	u/a	1998	Dec
190		Opsware	56	262%	n/m	(211)	n/m	n/m	162	n/m	150	94.7	OPSW	380	-39%	147,368	1999	Jan
191	164	Blue Coat Systems	56	-43%	n/m	(247)	n/m	n/m	169	n/m	47	40.0	BCSI	238	-52%	233,613	1996	Apr
192	190	Packeteer	55	18%	50%	4	n/m	7%	61	n/m	294	65.5	PKTR	204	5%	269,608	1996	Dec
193	191	ACT Teleconferencing	54	16%	23%	(8)	n/m	n/m	80	n/m	12	3.2	ACTT	u/a	u/a	u/a	1989	Dec
194		j2 Global Communications	48	45%	69%	14	n/m	30%	50	n/m	301	32.8	JCOM	160	19%	301,250	1995	Dec
195	186	Interactive Intelligence	48	0%	40%	(8)	n/m	n/m	81	n/m	45	15.2	ININ	347	-10%	137,752	1994	Dec
196	182	Dot Hill Systems	47	-17%	-8%	(34)	n/m	n/m	110	n/m	151	12.1	HIL	215	-8%	218,140	1988	Dec
197	199	DSL.net	46	8%	240%	(36)	n/m	n/m	115	n/m	29	11.3	DSLN	u/a	u/a	u/a	1998	Dec
198		Opnet Technologies	45	36%	30%	5	55%	10%	60	20%	117	62.2	OPNT	268	20%	167,164	1986	Mar
199		Latitude Communications	41	19%	14%	(19)	n/m	n/m	95	n/m	28	25.2	LATD	u/a	u/a	u/a	1994	Dec
200	192	Keynote Systems	38	-17%	90%	(66)	n/m	n/m	128	n/m	213	239.3	KEYN	227	-13%	166,960	1995	Sep

n/m = Not measurable u/a = Unavailable at press time

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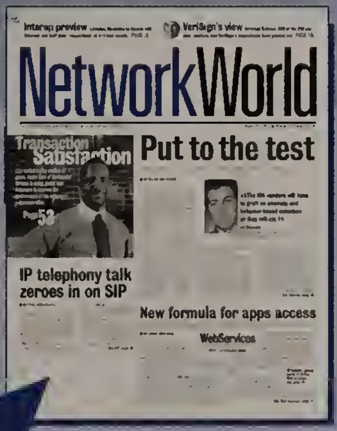

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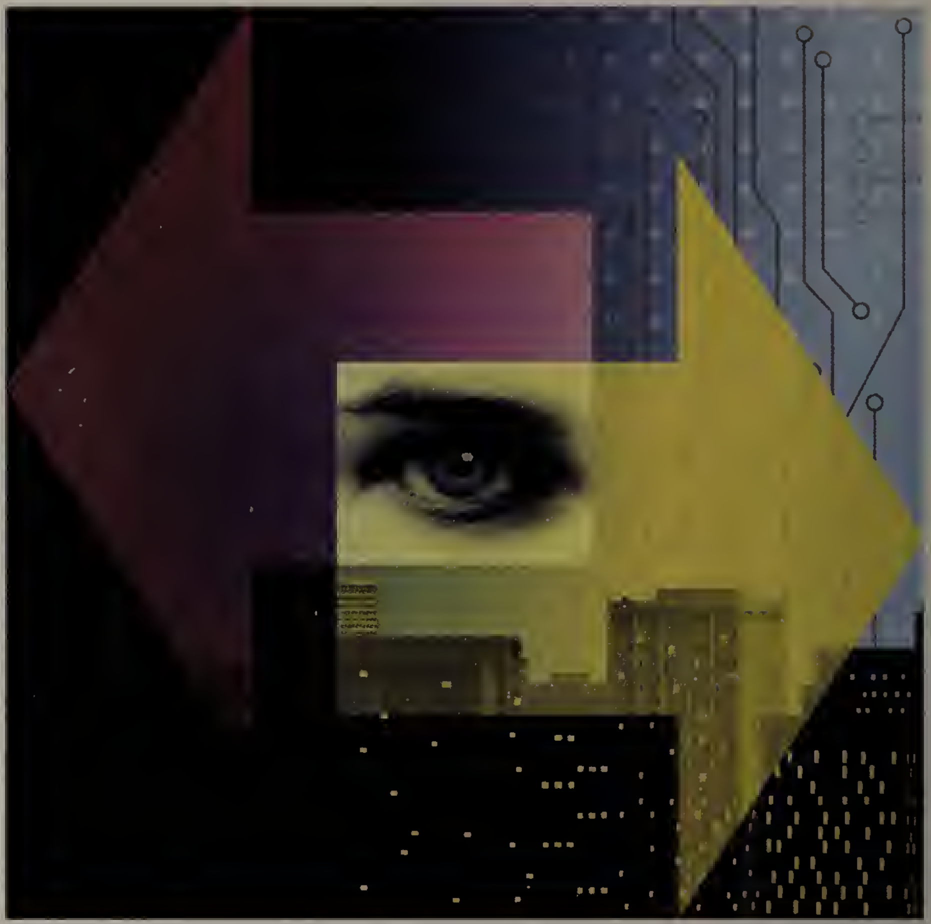
Sector *summaries*

2002 was a test of survival for many companies within the enterprise applications, infrastructure and service provider sectors. Yet analysts remain bullish that promising technologies will secure each segment's recovery.


RICHARD TURTLETAUB

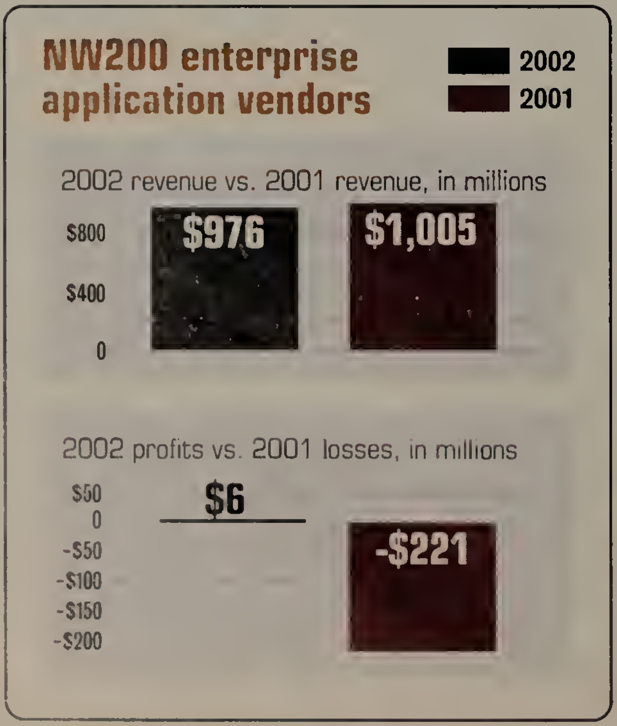
BY JULIE BORT

Enterprise applications

Users continue deploying large ERP, CRM and supplier relationship management software packages, but application integration and smaller, XML-based, gap-filling tools are gaining allure.

These XML-based "composite applications" consolidate or process data from multiple applications to create, for instance, a forecasting report, says Joshua Greenbaum, principal for Enterprise Applications Consulting. He points to SAP's xApps or, to some extent, J.D. Edwards' collaborative and forecasting tools as examples of composite applications. "Customers don't want to buy three-letter acronyms anymore. They want products to solve specific application problems," he adds.

Enterprise application integration (EAI) tools also are gaining popularity. They, too, let various applications work together. Although IT budget growth will increase a mere 2% through 2004, spending on integration, including middleware, EAI, database and electronic data interchange will grow at twice that rate, AMR Research finds.


NW200 enterprise application vendors

Internal application integration has the highest priority, then extended enterprise projects, with spending of $2.8 million annually vs. $1.5 million, respectively, according to 2002 budgets, AMR says.

Security software remains a top budget item, too. This market will grow by about 16%, compounded annually from 2001 to 2006, IDC says.

Despite a rosy growth future, NW200 software vendors — even those offering security products — still feel the soft economy. Some 60% reported lower revenue in 2002 than in 2001, and 74% declared a loss.

Still, the sector posted respectable numbers this year over last: The 2002 average revenue for the sector was $976 million, which generated $6 million in profit. This compares with 2001 revenue of $1 billion on which these vendors lost $221 million. (These figures exclude IBM, included in the infrastructure sector instead because it earns 50% or more of its revenue from hardware sales.) The ever-profitable likes of Microsoft and Oracle carried this segment, helped along by ERP/CRM/SRM vendors such as J.D. Edwards and PeopleSoft and topped by security vendors Check Point and Network Associates — albeit both Check Point's revenues and profits slid from last year, even though its 60% profits from $427 million in revenue keep it as one the NW200's most profitable companies. Also of note is Symantec's 26% increase in revenue, jumping it over the $1 billion mark.

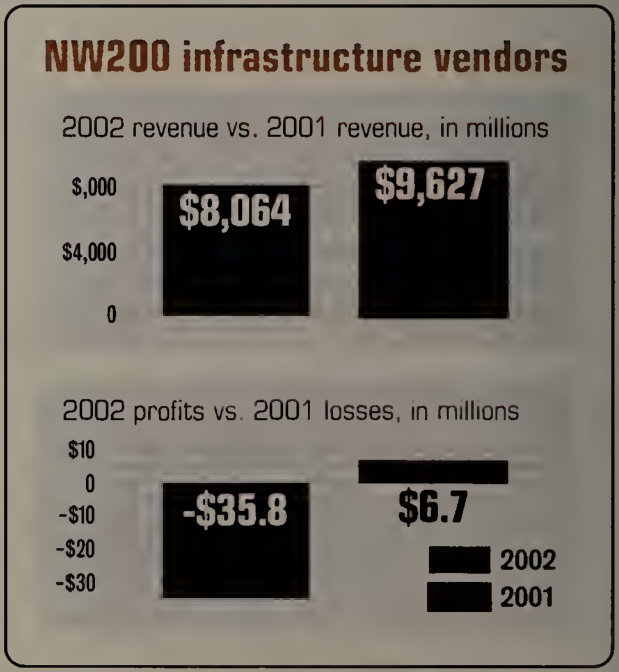
Infrastructure

The infrastructure market continues to sail on a predictable path based on the need for ever-increasing speed. And so four out of the 10 most profitable NW200 companies are those that make their livings selling infrastructure gear to handle that need for speed — Cisco, Dell, IBM and Intel.

Still, overall sales in the bread-and-butter router market declined 15% to $6.1 billion in 2002, Dell'Oro Group says. That won't always be the case. As Ethernet continues to rise to carrier-class speeds, worldwide sales for Gigabit Ethernet equipment, including routers, will reach $10 billion by 2008, Pioneer Consulting says.

Until then, infrastructure vendors have been eyeing technologies to generate growth over the next few years. The likely candidates, analysts say, are IP PBXs, wireless LAN (WLAN) switches and newfangled storage systems.

"We are definitely seeing traction for IP PBXs," says Kathryn Korostoff, president of Sage Research. In a Sage IP study, 75 of 100 users surveyed named cost savings as a reason to buy IP PBXs, while more than 60 said increased productivity was a big driver.


NW200 infrastructure vendors

According to WinterGreen Research, the worldwide IP PBX market will reach $3.1 billion by 2007, up from $272 million in 2001.

WLAN's promise stems from decreased costs, security improvements and the cry for anytime/anywhere connectivity. Worldwide WLAN hardware revenue totaled $1.7 billion in 2002, tallying $455.4 million in the fourth quarter of 2002, Infonetics Research says. North American businesses accounted for 58% of purchases, with corporations buying 41%, compared to spending by service providers (9%) and consumers (50%). Infonetics predicts a $2.7 billion worldwide WLAN market in 2006.

When it comes to storage, The Yankee Group estimates that $14.3 billion of storage-area network equipment, including network-attached storage devices, will be sold in 2003 and $24.2 billion in 2005. Still, many NW200 storage-specific hardware and management vendors struggled in 2002, earning a mean revenue of $3.4 billion with losses totaling $115 million. Whereas network and server gear vendors hit $8.3 billion in revenues, $94 million in profits (with some, such as Cisco, HP and IBM, also in the storage market).

Growth can't come too soon. When combining network gear vendors with storage system makers, 74% experienced declining revenue in 2002 over 2001, with 74%, too, declaring a loss.

Service providers

The service provider sector isn't completely over its troubled past, but analysts are optimistic. Four of the 10 most profitable NW200 companies fall in this sector: BellSouth, Nextel Communications, SBC and Verizon.

Infonetics Research is bullish on the future of both carriers and their suppliers by 2005, says analyst Kevin Mitchell, although he believes the sector will stay soft this year.

Much promise lies with the regional Bell operating companies' aspirations of becoming national data carriers — once they secure FCC approval, Mitchell says. "RBOCs are definitely pushing Multiprotocol Label Switching as a transport of future IP services," he says. RBOCs will serve up new MPLS-based services such as managed VPNs. NW200 providers offering such services, or with announced plans to do so, include BellSouth, SBC and Verizon. Mitchell says he sees a place for competitive local exchange carriers to serve small to midsize businesses, as RBOCs focus on corporations.

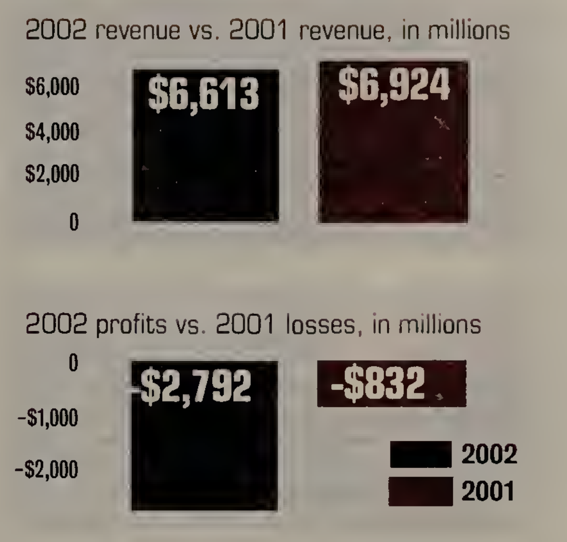
WinterGreen also sees RBOC growth; he expects them to tally $238.1 billion in revenue by 2007, from $170.1 billion in 2001, with wireless offerings as big drivers. Probe Research concurs, predicting that in 2007 IP over wireless will join voice-over-IP technologies as a major service provider offering.

Yet the old standby, frame relay, will grow in popularity too, The Yankee Group says. The frame relay market is expected to reach $10.7 billion in the U.S. by 2006, from an estimated $8.4 billion in 2002.

Still 2002 was a test of survival for many carrier suppliers, including Ciena (No. 87) and Sycamore Networks (No. 176). Revenues were down 77% and 83%, respectively. Losses were about $1.6 billion for Ciena, $380 million for Sycamore.

When considering both providers and equipment makers, 68% declared a loss, while 52% reported declining revenue. In dollars, this amounts to a mean of $6.6 billion in revenue, resulting in a $2.8 billion loss. Note that these figures do not include WorldCom, dropped from the NW200 for its Chapter 11 status. But they do include some other astounding losses: AOL Time Warner's almost $100 billion, Qwest's nearly $36 billion and AT&T's $13 billion. ■

NW200 service providers and their equipment makers



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JACK UNRUH

Good governance *or cheap* makeover?

New legislation aims to keep the business scandals of 2002 from repeating. But network vendors may still be glossing over the need for better corporate governance.

BY JULIE BORT

Corporate governance is becoming the business phrase that defines early 2003, just as Internet bubble buzzed 2001; New Economy, 2000; and pre-IPO, 1999.

Prodded by federal legislation and new rules from the Securities and Exchange Commission (SEC) and its financial arm, the Financial Accounting Standards Board, corporations have scrambled to remake themselves in the image of honesty. One such trend is the creation — or revitalization — of a board-level corporate governance committee, a tactic of such Network World 200 companies as Computer Associates, Microsoft, Sprint and Sun.

The idea of a board-level governance committee is not new. IBM formed one in 1998. But such committees are gaining teeth as nearly all companies scramble to resculpt their boards to comply with the Sarbanes-Oxley Act, pushed through Congress and signed into law July 30, 2002, in response to last year's billion-dollar accounting scandals and bankruptcies. This law's sprawling attempt to establish good corporate governance covers everything from the definition of independence for independent directors to rules for auditing quality.

Governance committees theoretically are being handed the reins of honesty, although each might have different goals. While Microsoft's governance committee directs compliance with the legal orders that the antitrust judgement has imposed, CA and IBM governance committees oversee board structure itself. CA's committee is tasked with finding directors, reviewing board performance and coordinating the CEO evaluation process, largely in an attempt to clean up the company's longtime bad-boy image. (A separate committee oversees the CEO compensation plan, an area that landed CA in trouble in 2000.) Likewise, IBM's governance committee reviews the qualifications of potential directors and compensation for outside directors, and handles the significant issues pertaining to corporate or public responsibility, such as workforce diversity or environmental impact. Best practices require that governance committees be staffed with a majority of independent directors.

The question remains whether any of this activity is making IT companies more honest. Board-level corporate governance changes are useful to the extent that they provide obstacles to abuses, says Warren Dennis, litigating partner in the corporate governance group for New York law firm Proskauer Rose. But that alone might not be enough, he adds. "The mythology says boards run the company and management is accountable to the board. But the practical day-to-day operations are run by management, and, consequently, management runs the board," he says.

Loud proclamations of new governance practices could be nothing more than an act. Governance experts agree that badly governed companies, while perhaps complying with the letter of the law, likely will stay badly governed. Conversely, well-governed companies likely will remain so.

Questionable behavior is a trait of particular vendors, says Bernie Lubitz, director of telecommunication technology and services for Martin Memorial Health Systems, a hospital system with 10 locations in South Florida. Recounting his five-year struggle to get MCI WorldCom to rectify billing and service problems, Lubitz says, "I don't have any real answer why the company is so difficult. I've got to think that lack of ethical perspective starts at the top and is passed down to the rest of the employees."

Today, being able to spot a worthy vendor from a charlatan requires knowing how to evaluate the board's real role, understanding the typical ways tech companies go astray and recognizing the signs that trouble is afoot.

Split personalities

Some governance experts say the tech industry is no more badly governed than any other industry. But most agree it is more susceptible to some of the worst governance infractions. Then again, IT companies also tend to employ some good governance practices. For instance, they are open to change.

"Some things are built into the DNA of IT companies that are long-term governance strengths," says Ralph Ward, author of the book *Saving the Corporate Board: Why Boards Fail and How to Fix Them*. "IT companies are more willing to vote themselves out of business as a company — let's merge, let's consolidate, let's roll up — than a lot of older smokestack-type companies, where they think, 'We've got to stay independent.'"

Ward also points out that IT vendors tend toward smaller boards and more commonly will separate the chief executive and chairman functions than do companies in other sectors. "Tech companies have been a little bit ahead of the curve . . . because when you start out with a venture company, you tend to have those split roles," he says.

Examples from the NW200 include Cisco, EMC, Intel, Nextel Communications and, more recently, Microsoft. This contrasts greatly with the attitude in other industries, particularly venerable Fortune 500 companies. When the CEO is not also chairman, it's seen as a vote of no confidence.

However, the value of splitting those roles isn't clear. Ward questions whether chairman is really enough of a job. "It's sort of like being captain of a ghost team," he says. "The CEO has all of the power — the budget, everyone works for his office. If you are solely the chairman of the board, what do you have? You have a piece of paper saying you have legal authority over a body of distracted amateurs, the directors. It's been an uneven match."

Dennis says role separation is "an issue of the cosmos. It's so idiosyncratic and has to do with the personalities, the history of the company."

Some network executives prefer to award contracts to vendors with split top roles. "I don't believe that a CEO should double as the chairman. If they are one and the same person, there are no upper-level checks and balances. The CEO can do whatever he wants in the day-to-day operation of the corporation," Lubitz says.

Plus, Sarbanes-Oxley (and the SEC-imposed rules supporting it), once implemented, could give boards some real power, making the chairman job more worthwhile. New SEC rules adopted in January require independent financial auditors to report their findings directly to the board audit committee, giving that body direct insight into — and better control over — company practices.

However, muscle gained from legislation won't stop crooked managers intent on deceit. Ward says: "It's still going to be possible to hide something in the closet from the board of directors. And I think directors know that." Likewise, Dennis questions who would be willing to sign up as the independent financial expert — one who has no interests as a stockholder, customer, partner or supplier — now required for a board's audit committee. The liability for that role is high, he says.

Get a clue

Proxy statements hold all sorts of clues about a vendor's governance attitudes. Just look at what we found in Comcast's.

Nightly news clips of suited men in handcuffs didn't deter Comcast executives from engaging in questionable governance when asking shareholders to approve the AT&T Broadband merger. Their goal, experts say, was to ensure their power over the board.

Section II-13 of the preliminary Comcast proxy statement filed with the SEC on April 30, 2002, noted bylaw changes that would have had no new directors appointed until the 2004 annual meeting (after originally attempting to keep them until 2005). More telling, Comcast sought a bylaw change by which the CEO and chairman could only be removed by a "supermajority" vote of the board, specifying at least 75% of board members would have to approve either executive's removal. "This supermajority removal requirement will make it unlikely that C. Michael Armstrong or Brian Roberts will be removed from their management positions," the proxy statement says.

"That's a kind of corporate governance larceny," says one governance expert of such tactics, stitched as they were into a merger proxy. The SEC reportedly told Comcast to separate the proposals for these bylaw changes.

A revised definitive 14A proxy statement filed to the SEC on May 14, 2002, continued to note the supermajority change. However, a revised definitive agreement filed May 30 did not include a supermajority clause.

— Julie Bort

Users performing due diligence on their potential vendors should ask if the company has adopted new board-level governance committees, or recently revised the charter of existing committees. A glance at the biographies of board members, available in the investor-relations section of most corporate sites, also could be helpful. In particular, members of the audit committee are far more empowered with governance matters than ever before.

Ask, too, if the board conducts formal, periodic evaluations of the CEO and ties compensation decisions into those reviews, Ward says. If so, the board likely has true and significant control over the CEO, he says.

High-tech weakness

On the downside, network vendors are particularly susceptible to one of the worst kinds of governance weaknesses: inflating valuations. The issue arises because no values exist for many assets that IT vendors commonly exchange. Dennis offers the example of the regional network service provider that owns fiber in Southern California but wants to grow nationally. Rather than laying new fiber nationwide, it exchanges fiber access rights with carriers serving other regions.

Such like-for-like exchanges are honest, Dennis says, and benefit cash flow. But no standard value has been set "for the right to pass an electron on someone else's network," he says. So corporate management and accountants guess that value. As these folks are pressured to grow the company, they might succumb to temptation and use ridiculously inflated made-up values.

Qwest landed itself in trouble because of such "swap transactions" in which it exchanged optical capacity, and payment for such, with another carrier. Logging that exchange as revenue while simultaneously failing to properly note certain expenses artificially inflated revenue. In September 2002, it wound up restating $950 million in revenue booked between 2000 and 2001.

Such temptation isn't restricted to exchange of networks. It involves any intangible asset, says Fred Kaen, professor of finance for the University of New Hampshire in Durham and author of the recently published book *A Blueprint for Corporate Governance: Strategy, Accountability and the Preservation of Shareholder Value*.

For tech companies, intangible assets such as engineering reputation and brand name tend to be worth as much or more than their physical assets, such as corporate real estate. "But placing a value on intangible assets is much more difficult than placing a value on tangible assets. So, more wiggle room exists for how to report value of the assets," Kaen says.

Dennis recommends that customers routinely skim vendor financial reports to watch for irregular transactions. Those should be more apparent now, if the vendor abides by the SEC's January ruling that companies disclose off-balance-sheet arrangements in their quarterly and annual reports. "If you see an irregular transaction and it doesn't make sense to you, it probably doesn't make sense," he says.

Other red flags, such as resignations or changes in outside auditors or law firms, might be easier to spot. The SEC has proposed that lawyers who spot material wrongdoing to engage in a "noisy withdrawal" if the company refuses to alter course. Such a resignation, claimed for professional reasons or similar verbiage, would signal Wall Street and the SEC that something is amiss, Dennis says. Lawyers are balking at the proposal, saying a noisy withdrawal compromises attorney-client privilege and forces them into a watchdog role. However, Sarbanes-Oxley requires the SEC to establish rules of conduct for lawyers. So whether noisy withdrawal or some other resignation policy becomes law, customers should take a shift in lawyers or auditors as a warning.

A second problem for IT companies is the board with conflicts of interest. In addition to the pressure that all public companies have in finding independent financial specialists for their audit committees, tech firms face another challenge — the company-town environment of Silicon Valley, which remains the deepest source for potential directors.

"You have a hothouse environment, so it can make it a little harder to meet current best practice of so many degrees of separation," Ward says.

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A final area where tech companies face the temptation of abuse is in using and reporting stock options. Many tech companies need to conserve cash to pay for growth. Offering stock options for employee compensation is one way of maintaining cash. "This compensation scheme sets up the potential for the owner/managers to use creative and aggressive accounting to make the company look as good as possible to public investors and thereby drive up the stock price," Kaen says.

One such abuse was failure to properly note the effect of stock options on overall financials. However, in this down market, options aren't the lure they once were. Most companies have bowed to political pressure and begun to expense them using a method called fair value. Fair value is a realistic estimate of the cost incurred to the company should employees exercise their options. The Financial Accounting Standards Board has issued new rules on how to execute the fair value method and has mandated more "prominent" and frequent disclosing of how stock options affect financials.

Network executives who determine how their vendors report options can better understand claims of financial growth.

Friends and small print

Look to the footnotes in proxy statements, quarterly and annual reports, and other formal SEC documents to get an idea on how serious companies are about their governance ethics. A proxy statement that notes a CEO lost a yearly bonus because of poor stock-price performance signals that the compensation committee is powerful, Ward says. Lubitz further recommends pulling Dun & Bradstreet reports, which indicate status with creditors, and looking at stock performance. He taps the wizards in his finance department to give him insight.

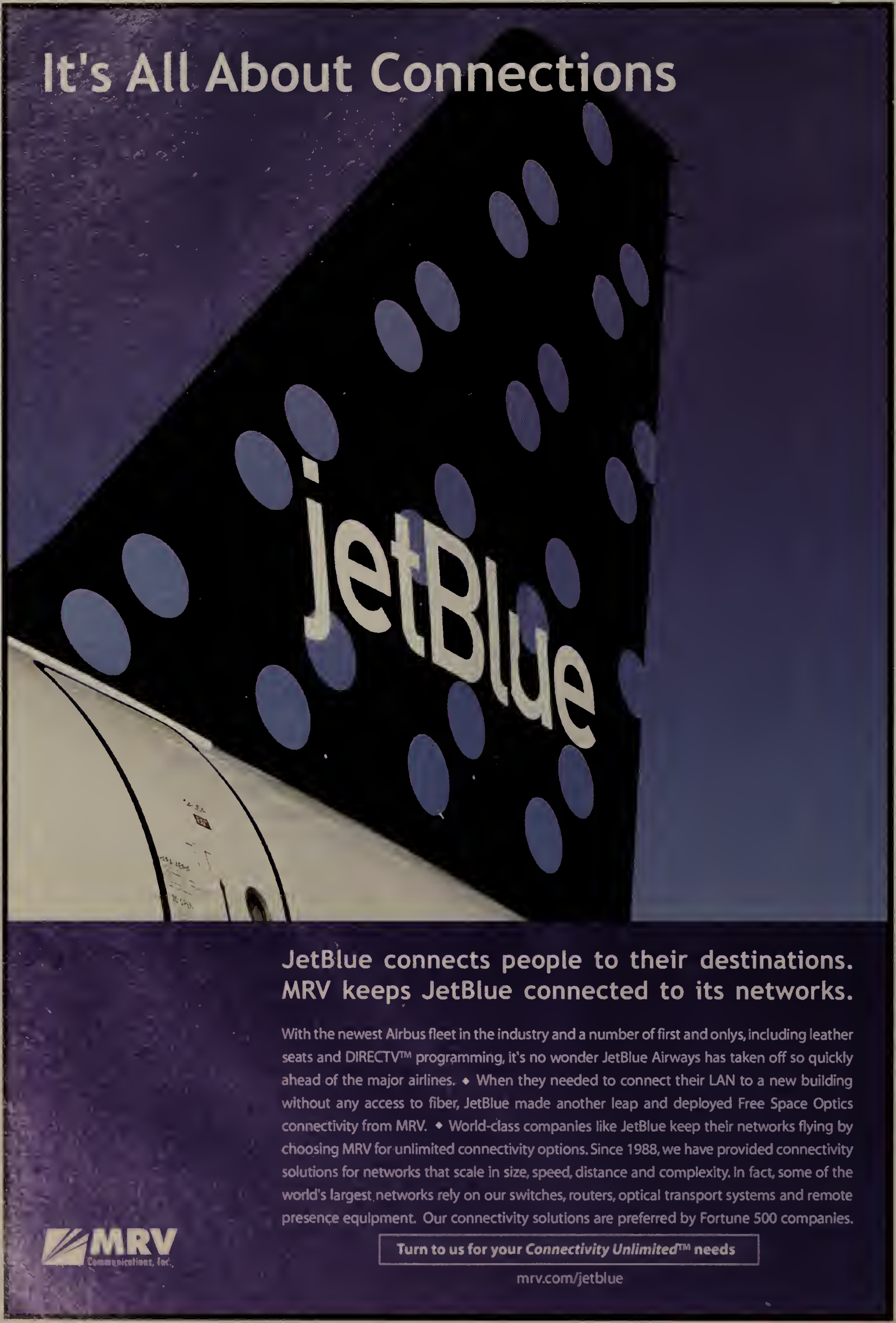
For Doug Jackson, director of technology customer services at University of Texas at Dallas, other IT professionals are the best sources of information on a vendor's governance practices. "We always check around with our peers and find out who has had a good experience with a vendor and who hasn't," Jackson says. "The corporate attitude permeates from the boardroom to the salesforce, and talking to other people that deal with the specific company on a regular basis is probably the best thing you can do."

For corporate governance, the lesson learned in 2002 is that everyone — the board, the accountants, the lawyers and even the customers — must be watchdogs. ■

Governance check

Find out how a vendor is governed with these questions:

- Does the company have a board-level governance committee? If so, how long ago was it established and when was the last time its charter was updated?
- Does the board evaluate and grade the CEO? If so, how often? Who does the evaluation (a person or a committee)? Is it tied to compensation?
- Who is on the board-level audit and compensation committees? What are their backgrounds?
- What firms provide auditing and legal services, and how long have they been associated with the company?
- How many independent directors are on the board, and who are they?
- How is the stock performing and why, according to independent financial experts you trust?
- Does the company expense stock options, and, if so, does it use the fair-value method? What effect on financials do stock options have, according to company reports?
- What do peers say about the vendor?



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10 start-ups to watch

BY NETWORK WORLD STAFF

These young vendors offer fresh approaches for addressing today's enterprise network challenges, from setting up secure wireless LANs to virtualizing data center resources.

Aruba Wireless Networks

MICHAEL MILLER

Company name: Founders wanted a one-word name that began with "A," could be easily pronounced by its polyglot staff and connoted "something pleasurable."

Origin: Founded in February 2002 by Pankaj Manglik and Keerti Melkote, who have senior management experience at Alteon WebSystems, Cisco, Nortel and Shasta Networks.

Funding: $9.5 million in one round closed in April 2002.

Investors: Matrix Partners and Sequoia Capital.

CEO: Pankaj Manglik.

Products: Unnamed wireless LAN switch and simplified access point for centralized security and management of WLAN packets and radios.

Aruba Wireless Networks likely will be the first start-up with a product that lets network executives run their WLANs as they do their wired LANs.

Aruba's WLAN switch, in beta test now, is expected to ship by June. The switch sits in a wiring closet or data center, connected to a bunch of Aruba or third-party wireless access points. Users pass through an access point to the switch, which handles authentication, access policies and encryption, and creates a personal firewall for each user.

The San Jose company has released neither a name nor pricing for its wireless LAN switch. But it has said the switch is aimed at corporate sites that need to deploy scores or hundreds of access points, serving hundreds or thousands of users. Instead of a collection of separately installed and managed access points, the WLAN becomes a web of streamlined radios controlled by a switch that incorporates the features of a VPN, firewall and intrusion-detection system. Beta testers include MFS Financial and Sentinel Real Estate.

The company also is targeting the public access, or wireless hot spot, market where service providers plan to deploy WLANs to create broadband VPN access for corporate road warriors.

Problems with securing wireless networks are so acute, and the opportunities so enormous, that a crowd of vendors is racing to bring out similar products. Among them are other start-ups such as Airespace (formerly BlackStorm Networks), AirFlow Networks, Trapeze Networks and Vivato; established WLAN players such as Proxim and Symbol Technologies; and wireless security gateway vendors like Bluesocket, Cranite Systems, Fortress Technologies and Vernier Networks. Some observers expect some of the big network vendors such as Cisco and Nortel to play in this field, too.

Only as these products emerge will the distinctions among all these players become clear. For its part, Aruba is stressing comprehensive security features, such as the ability to monitor radio transmissions and to detect and block rogue access points. The company also is touting automated features that simplify deployment costs, such as the switch's ability to detect and configure new access points, and continuously adjust radio power levels and channel assignments.

How the market shakes out remains to be seen, too. Certainly network equipment vendors such as Cisco have switching expertise, but marrying switch and radio technology is as complicated for them as for the start-ups. And so far, Cisco says it favors a distributed network of intelligent access devices. Aruba might have many sunny days ahead.

— John Cox

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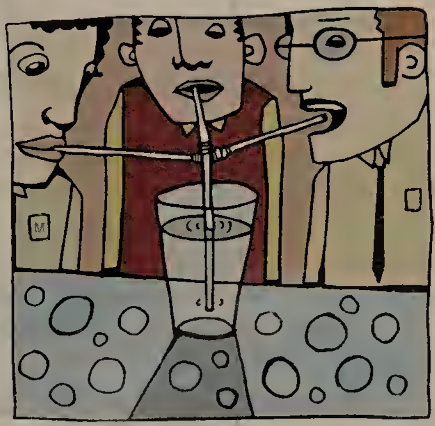
10
START-UPS TO WATCH

Avaki



Company name: "Avaki" is derived from a French-Polynesian word that describes the equitable distribution of resources in a community.

Origin: Andrew Grimshaw founded Applied MetaComputing, Avaki's predecessor, in February 2001 to commercialize a government-funded grid computing project he initiated at the University of Virginia. He relaunched the company as Avaki that June.

Funding: A $4.2 million first-round extension closed in February 2003, bringing total funding to $20 million.

Investors: General Catalyst Partners, Polaris Venture Partners and Sofinnova Partners.

Top executives: Tim Yeaton, president; Andrew Grimshaw, CTO.

Products: Avaki Data Grid, for providing access to geographically dispersed data sources; Avaki Compute Grid, for aggregating and managing processing resources; and Comprehensive Grid, a bundle of Avaki's data-and-compute grid products.

Avaki got its start building software to aggregate and manage unused CPU horsepower, but the company is making its mark solving a different enterprise challenge: sharing distributed data among remote teams and with external partners.

Avaki, of Burlington, Mass., released its first product, Avaki Compute Grid, in the fall of 2001. This traditional grid software is designed to harness unused CPU cycles and dole them out to compute-intensive applications.

Customers took to a feature that let them serve data to users and applications over a wide area, inspiring Avaki to expand its focus to include distributed data access, says Tim Yeaton, Avaki's president. The company initially integrated data-grid functions in Compute Grid, then released the stand-alone Data Grid software in December 2002.

"Data Grid came to be because customers told us that wide-area data access was a fundamental issue in their companies," Yeaton says.

Avaki Data Grid gives users access to data that's scattered across myriad corporate and partner systems, letting distributed teams collaborate without having to know where data is stored. Administrators can serve data from a single source to all users and applications without having to replicate or alter existing data stores. It's an alternative to access technologies such as VPNs, FTP and demilitarized zones, Yeaton says.

No client software is required for Data Grid, which starts at $35,000. Data Grid sits on servers at each team location; firewall proxies let Avaki traffic pass through firewalls. The software handles usage rights and access privileges so administrators can limit what different users can access.

With Version 3.0 of Data Grid, introduced in December, Avaki ported the software to Java and Java 2 Platform Enterprise Edition to make it easier to deploy and integrate with existing IT infrastructures, Yeaton says. The company built in enterprise software capabilities, including failover support and the ability to integrate with existing directory services, such as Lightweight Directory Access Protocol, Microsoft Active Directory and Sun One Directory Service, for user authentication.

These days, Avaki is trying to expand grid-computing implementations beyond traditional academic and research settings, and into the corporate realm. Targeted industries include life sciences, manufacturing, energy and petrochemical. The company's 12 customers include Gene Logic, Infinity Pharmaceuticals and Pfizer.

— Ann Bednarz

Force 10 Networks

Company name: Named for the market it targets — 10G Ethernet switching.

Origin: Founded in May 1999 by Prabhat Dubey, formerly the entrepreneur-in-residence at U.S. Venture Partners (USVP). Before that, he was CEO of network processor vendor MMC Networks.

Funding: A $42 million third round closed in February 2003, bringing total funding to $210 million.

Investors: Amerindo Investment Advisors, New Enterprise Associates, Pacesetter Capital Group, USVP and Worldview Technology Partners, among others.

CEO: Prabhat Dubey.

Products: E1200 and E600 10G Ethernet switches.

Many companies today don't need the kind of network horsepower Force10 Networks offers with its 10G Ethernet switches, but if Moore's Law holds true, they soon will.

Force10, in Milpitas, Calif., focuses on the 10G Ethernet switch market, which Dell'Oro Group forecasts to grow in worldwide revenue from $250 million in 2002 to $3 billion by 2005. To go after this market, the company announced and started shipping its E1200 switch last fall, which can house up to 336 Gigabit Ethernet ports or 28 10G Ethernet ports (the most in the industry).

The company is taking on high-end switch vendors Cisco, Extreme Networks, Foundry Networks and Nortel with a simple tactic — build a bigger, faster switch. Designed from the get-go for 10 Gigabit speeds, the E1200 is the only chassis today that provides a full 10G bit/sec of bandwidth to each 10G Ethernet port inserted in the box. Most 10 Gigabit switch modules, which fit in chassis that predate 10 Gigabit speeds, allow for a maximum of 6G to 8G bit/sec of bandwidth. Competitors likely will catch up in the next 18 months, leaving Force10 a short time to ingratiate itself as the fastest kid on the block, analysts say.

Betting a large enterprise backbone on a start-up could be risky, but a growing number of user organizations are taking the chance. Force10's customer list includes the Albert Einstein Institute, a German physics research firm; the California Institute of Technology; the San Diego Supercomputing Center; and the University of Amsterdam. And the company continues to woo investors, having recently closed a sizable third round of funding.

No doubt, the 10G Ethernet market is small today. The 25,000 ports shipped last year account for less than 0.1% of all Ethernet ports sold, according to analysts. But as Gigabit Ethernet infiltrates desktops and becomes the server standard, larger pipes inevitably will be needed in the enterprise core — and that's what Force10 is betting on.

— Phil Hochmuth

IMLogic

Company name: Company founders wanted to convey how they help customers make sense of instant messaging in the enterprise, so they married logic with the IM initials.

Origin: Founded in February 2001 by Francis deSouza and Jon Sakoda. DeSouza had been head of Microsoft's real-time collaboration group, which he joined after the software giant bought his instant-messaging company, Flash Communications. Sakoda worked at Goldman Sachs, where he was a strategic adviser to software companies and was instrumental in managing the firm's $1.5 billion technology private equity fund.

Funding: A $14 million second round closed in January 2003, bringing total funding to nearly $18 million.

Investors: General Catalyst Partners, Goldman Sachs, Kodiak Venture Partners and Venrock Associates.

CEO: Francis deSouza.

Product: IM Manager.

IMLogic's IM Manager is the sheriff in the Wild West of instant messaging, as the grass-roots adoption of instant messaging spreads unchecked — and unmanaged — across major companies. IM Manager provides corporations with the means to control and track usage of instant messaging, introduce security and policy compliance regulations. It also provides reporting and archiving features.

IMLogic's focus is controlling the pipes that carry instant-messaging traffic. The server-based IM Manager supports the most popular instant-messaging products, including those from AOL, Lotus, Microsoft and Yahoo. Big-name users such as Bear Stearns and Merrill Lynch have turned to IM Manager to control instant-messaging usage.

The software's signatures are that it does not require installation on clients and that it integrates with Lightweight Directory Access Protocol-compliant corporate directories. Directory integration lets administrators take cryptic instant-messaging screen names and link them to established corporate usernames, control access and selectively archive messages based on users and groups categorized in the directory.

IM Manager, which costs $5,000 per server plus a client access license fee based on the number of users, also lets users block file transfers and create reports that provide details such as average message size or usage by time of day or department.

The Waltham, Mass., company is working on adding virus scanning and a stand-alone gateway product that will integrate disparate instant-messaging software, much like technology that linked e-mail systems before the advent of messaging standards.

Standards also will change the nature of instant messaging and pressure companies such as IMLogic and its top-tier competitor FaceTime Communications because major platform providers will begin to build instant-messaging management into their software. As a pioneer in the instant-messaging management market, IMLogic bears watching.

— John Fontana

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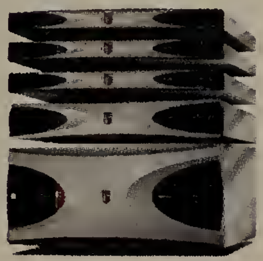

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NetContinuum

Company name: Chosen to reflect support for the continuum of 'Net-related security issues.

Origin: Founded in September 1999 by Jan Bialkowski, Peter and Wing Cheung, formerly engineers at network vendors including Bay Networks, Berkeley Networks and Fore Systems.

Funding: A $26 million second round closed in April 2001, bringing total funding to $35 million.

Investors: Adams Street Ventures, Invus Group, Menlo Ventures, NIF Ventures/Daiwa Securities and Siemens Ventures.

CEO: Gene Banman, previously a Sun executive.

Product: NC-1000 Web Security Gateway.

NetContinuum wants to supply network protection and secure remote access à la traditional firewalls and VPNs, but with an exclusive focus on Web traffic.

This Santa Clara, Calif., company is shipping a network appliance that sits between firewalls and Web servers, terminating TCP sessions and blocking hacker scans, worms and application-layer attacks. When configured as such, the NC-1000 Web security gateway also can act as a remote access gateway, requiring authentication before letting remote users access restricted Web applications. Remote machines require only Secure Sockets Layer-enabled Web browsers as their remote access client.

NetContinuum is not alone among vendors approaching Web application security. Competitors include Array Networks, Sanctum and Teros, each of which approach the problem a bit differently. NetContinuum's slant is a purpose-built processor the company says can set up 4,000 new sessions per second and support 1 million simultaneous sessions at wire speed. The goal of the Continuum Security Processor is to ensure server protection without forcing traffic slowdowns, NetContinuum says.

To enhance security, the processor uses separate chips for administrative processing so network administrators do not have access to the content of traffic flows. The NC-1000 also can export data about detected intrusions to third-party network management platforms and firewalls, but NetContinuum has yet to formalize partnerships on this front.

The NC-1000 comes in two flavors, one with dual 10/100M bit/sec Ethernet ports for $28,000, and the other with dual Gigabit Ethernet ports for $38,000. NetContinuum has a number of high-profile users among its customers, including the Navy Federal Credit Union, Ross Stores and the U.S. Department of Energy.

— Tim Greene

Sana Security

Company name: The founder sees parallels between the human immune system and computers, believing you can "sanitize" server programs against new threats, such as attempts to exploit vulnerabilities.

Origin: Founded in October 2000 by Steven Hofmeyr, a computer scientist and authority on computer security, immunology and adaptive computation.

Funding: A $10 million second round closed in June 2002, bringing total funding to $12 million.

Investors: El Dorado Ventures, Esther Dyson Ventures, The Entrepreneur's Fund and Sevin Rosen Funds.

CEO: John Zicker, a veteran software entrepreneur.

Product: Primary Response.

Stopping known worm or hacker attacks is something many security products, including antivirus software and firewalls, can do these days. But recognizing and blocking a new and unknown attack? That's a bigger challenge, and start-up Sana Security is out to prove that you can guard your servers against the perils of the dark unknown.

Sana, of San Mateo, Calif., which spent last year in stealth mode under the name Company 51, made its debut in February with server-based software called Primary Response. The software learns the "normal behaviors" of server programs and operating systems in a few days, and then is prepared to recognize attacks and either block them or alert administrators, says Steven Hofmeyr, founder and chief scientist.

For now, Primary Response runs on Sun Solaris and Microsoft Windows servers and is priced beginning at $6,500. The company plans IBM AIX and Linux versions.

Early adopters of the intrusion-prevention software buttress Hofmeyr's claim. "It detects changes and anomalies and gives you an alarm," says Tammy Lowe, CIO at Smith & Hawken, a retailer in Novato, Calif., that is rolling out Primary Response enterprisewide. "We've had people try and attack us from other countries, and it has detected and blocked [the attacks]."

Hofmeyr, a computer scientist who pursued his ideas while working a year at the Massachusetts Institute of Technology's Artificial Intelligence Lab, explains: "The body has the ability to take on new pathogens it hasn't seen before and respond to them." Computers can be given the same sort of advantage by constructing an "immune system" for them that detects abnormal activity, he says.

Developments in this area are known as "behavior-blocking software," for which a few players are trying to establish a name for themselves. Cisco is acquiring one of those that has, Okena, for $154 million in stock. Others include BBX Technologies, Entercept Security Technologies and Harris.

A drawback to behavior-blocking software is that it can be demanding in terms of configuration and oversight. Sana is out to prove it can sanitize servers without being a management burden.

— Ellen Messmer

Topspin Communications

Company name: The founders are tennis enthusiasts; putting topspin on a ball, causing it to rotate forward, requires much skill and control.

Origin: Founded in April 2000 by CTO Ross Schibler, formerly of Bay Networks, and Keith Wilkinson, vice president of hardware architecture, formerly of Lucent.

Funding: A $30 million second round closed in July 2002, bringing total funding to $48 million.

Investors: Accel Partners, Advent International, Duff Ackerman & Goodrich, Presidio Venture Partners and Redpoint Ventures.

CEO: Krish Ramakrishnan, formerly of Cisco, where he built and managed the content business unit.

Products: Topspin 90 Switched Computing System and Topspin 360 Switched Computing System.

Topspin Communications took a listing technology — InfiniBand, the next-generation I/O bus — and righted it with its own special spin. In the last six months, the company launched two intelligent multiprotocol appliances that interconnect servers clustered with InfiniBand for attachment to Gigabit Ethernet networks and Fibre Channel storage-area networks.

Topspin's game is data center virtualization. The goal of the high-end Topspin 360 Switched Computing System and the entry-level Topspin 90, which also host third-party applications for provisioning, security and other functions, is to make it possible for business-critical applications to run more efficiently and faster than they do in a traditional data center operation.

The switched approach and use of InfiniBand lets businesses overcome processing bottlenecks, the Mountain View, Calif., company says. The system CPU is relieved from processing I/O requests; rather, the network and storage devices process I/O themselves and the CPU is free to run applications.

The Topspin 360 consists of as many as 72 ports of InfiniBand, Fibre Channel or Gigabit Ethernet; the Topspin 90 has as many as 16 InfiniBand, two gigabit Fibre Channel and four Gigabit Ethernet ports. Pricing for the Topspin switches starts at $1,000 per port.

Topspin is not alone in its determination to finesse data center virtualization with multiprotocol switched network gear. Among competitors are start-ups InfiniCon Systems and Voltaire, both intent on putting their own spins on virtualization. So far customers Brigham Young University, Los Alamos National Laboratory and University of Washington like Topspin's game.

— Deni Connor

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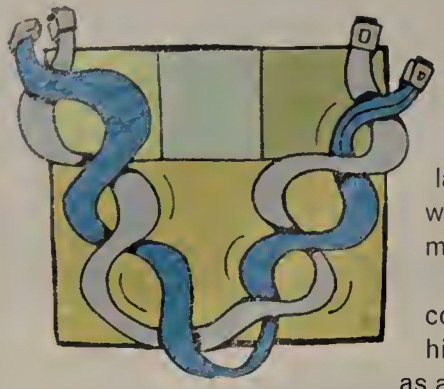


Vieo

Company name: Inspired by the Latin verb meaning to weave, as Vieo (pronounced Vee-oh) intends to tie modular, disparate pieces and parts of the network infrastructure together for holistic management.

Origin: Founded in January 2000 by the company's chief scientist, Jim Mott, who in his 20 years of high-tech experience worked as a lead architect for AIX operating systems.

Funding: A $15 million second round closed in January 2003, bringing total funding to $39 million.

Investors: Audax Group, BMC Software, Dell Computer, Eyes of Texas Partners, Flagship Ventures, Rho Ventures and TL Ventures.

CEO: Bob Fabbio, who founded a number of companies, including Dazel and Tivoli Systems.

Product: Adaptive Application Infrastructure Management (AAIM) appliance.

Vieo, of Austin, Texas, intends on giving enterprise network executives a new way of attacking application performance with its AAIM appliance, a Layer 2 switch loaded with application management software and running InfiniBand as a high-speed backbone. Vieo says that by 2005 AAIM will give network hardware vendors such as Cisco and application management providers such as IBM Tivoli a run for their money. Pretty big talk from a relative newcomer, but investors are listening.

Company executives say the AAIM appliance will approach application management from the inside rather than vendor software or hardware monitoring enterprise application traffic from the outside of an application server. Being a Layer 2 switch, the AAIM appliance will be able to see all the traffic as it traverses the network. From there, the appliance can take automated actions to improve application response times, avoid bottlenecks and prioritize traffic to support business-critical service requests.

Combining these capabilities will deliver on what Vieo calls "application quality of service" (QoS). The company argues that standard QoS reports on how well the disparate network elements perform, but Vieo's application QoS will ensure that business-critical applications get top priority and the necessary network resources to deliver on preset service levels. Companies including Icahn, Silicon Valley Bank and ZettaWorks, all beta testing the product, are willing to give it a shot.

The company will target its first product release, due out by midyear, at specific vendor application tools: Apache Web servers, BEA Systems' WebLogic application servers and Oracle database servers. Management of IBM WebSphere products, Microsoft .Net tools and other packaged applications such as those from PeopleSoft, SAP and Seybold Systems will follow.

In tackling small chunks now and expanding to a broader footprint over time, says CEO Bob Fabbio, "Vieo will keep adding support for different slices of the application infrastructure that for our competitors will represent death by 1,000 cuts."

— Denise Dubie

Z-Force

Company name: One of the founders liked the word G-Force because it sounded powerful. One day he saw a restaurant called Z-Pizza. Combining G-Force with Z-Pizza, he came up with Z-Force.

Origin: Founded in November 1999 by Vladimir Miloushev, CTO; Peter Nickolov, vice president of software engineering; Krasimira Nikolova, director of projects and programs management, all formerly of Object Dynamics; and Gary Johnson, former CEO of graphics acceleration company S3.

Funding: A $16 million first round closed in November 2001.

Investors: Allegis Capital, Alloy Ventures, Quantum Technology Ventures, Rock Creek Capital and Shoreline Ventures.

CEO: Gary Johnson.

Product: Z-force File Switch.

A newfangled storage device is what Z-Force has in mind to help users simplify and speed the way they view files stored on network-attached storage (NAS) appliances or Windows, Linux or Unix file servers.

The Z-Force File Switch aggregates files contained on different locally attached file-oriented storage arrays and presents them to the user in a single management view. The switch, which works with Microsoft's Common Information File System or Unix/Linux's Network File System, is designed for businesses in the rich content or high-performance computing market that want to deal with data that is often too large to fit on a single NAS device.

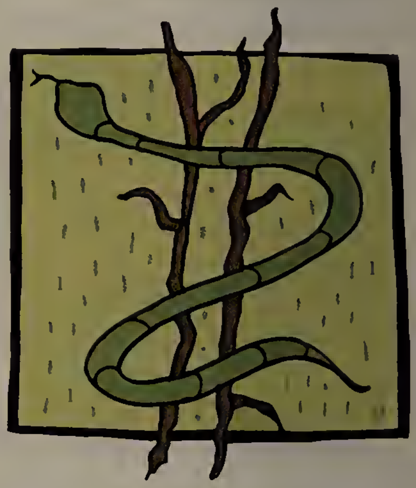
The Z-Force File Switch, which can accommodate as much as 47 terabytes of data in a single file system, streams data as fast as 2G byte/sec, the company says. The device is earning its stripes at Stanford University, where it is supporting a large-scale graphics project consisting of as many as two billion polygons that are defined by shape, number of points and color, and 7,000 color images.

The Santa Clara company, which is operating on a little more than $17 million, expects to attract a third round of funding when its $36,000 Z-Force File Switch ships this quarter.

Z-Force's key advantage, the company says, is in the uniqueness of its technology — the Z-force File Switch connects to a Layer 2 Ethernet switch, then to as many as 256 NAS appliances or file servers. This eliminates the latency concerns users have about virtualizing file-oriented devices. Even though other vendors, including start-ups Scale Eight and LeftHand Networks, aggregate NAS storage with a distributed file system or volume manager, Z-Force is the first company to relate the concept of switching to NAS virtualization.

— Deni Connor

Zultys Technologies



Company name: The name is derived from the word zaltys, a small green snake, which in Baltic traditions was a symbol of prosperity and wealth.

Origin: Founded in October 2001 by Iain Milnes, former founder of Zarak Systems, a telecom testing equipment maker sold to Spirent Communications.

Funding: Zultys is privately funded; Iain Milnes is the majority shareholder.

Investors: None.

CEO: Iain Milnes.

Product: MX1200 IP PBX.

Zultys Technologies hopes to make noise in the enterprise IP telephony market with two emerging technologies at its core — the Session Initiation Protocol (SIP) and Linux. And for good measure, the company has thrown in router, Ethernet switch and firewall functionality into its debut product, the MX1200 IP PBX.

Introduced in January and available now for businesses looking to converge voice and data over a single IP infrastructure, the MX1200 supports up to 4,800 users. This is accomplished by clustering four devices, each of which supports 1,200 users, into one system. Pricing ranges from $20,000 to $212,000, depending on the configuration and the number of users supported.

Zultys, of Sunnyvale, Calif., differs from many telephony competitors in that it will deliver voice using SIP, an emerging Internet Engineering Task Force standard for controlling the setup of voice, video and instant messaging sessions over IP. Observers say SIP could improve IP telephony equipment interoperability, while providing more advanced features than did previous standards, such as H.323, or proprietary voice-over-IP protocols used widely by vendors.

The product works with SIP-based phones from Cisco, IpDialog, Pingtel and Snom Technology, and can use a Microsoft Windows XP PC running the SIP-based Windows Messenger as a communications client. The MX1200 can also perform standard PBX functions like call forwarding, call pickup, caller ID, conferencing and intercom.

Zultys takes a different approach with its server platform, too. Using a real-time version of the open source Linux operating system addresses the concerns many have expressed regarding the danger of betting a telephony infrastructure on crash-prone and hacker-targeted Windows server technology.

While IP PBX competitors such as Alcatel, Avaya, Cisco, Nortel and Siemens have become more committed to migrating to SIP and investing in Linux, observers give Zultys the edge with a product coming out of the gate with these technologies. However, Zultys has not revealed any customers yet.

— Phil Hochmuth

Signature Sign-off

Where are they *now?*

BY BETH SCHULTZ

Five years, 50 start-ups. We look at what's happened to our start-ups to watch, 1998-2002.

In the last five years, the 50 start-ups we've designated as those "to watch" — 10 per year — have done it all: garnered sizable investments, pulled off mega IPOs and landed big buyouts by established network vendors. Of course, we've seen some shattered dreams, too.

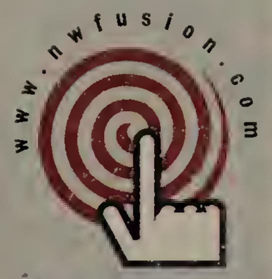
Hundreds of millions of dollars — $216 million since 2002 — have been spent making the technology ideas conjured up by these start-ups into deliverable products. We're still waiting to see the fruits of some of these labors, as a couple of our picks (namely, Procket Networks and Maranti Networks) still haven't said much about their impending products, much less shipped any. And we've seen some of the effort come to naught, as four start-ups folded amid tightening economic conditions, with at least one more, Surgient Networks, on the verge of collapse.

Still, far more of the start-ups — 58% of our picks — remain in business, four as publicly traded companies, including NW200 No. 125 Akamai Technologies, No. 95 Foundry Networks and No. 162 Red Hat Software. And one-third of our picks became the target of acquisition. Just late last year, IBM grabbed Access360 for its access-rights management software and Yahoo announced its intent to acquire Inktomi for its search capabilities.

As to those still operating independently, many remain in start-up mode, still establishing a name for themselves. But others have become well-known in their respective fields — industry watchers appreciate Bowstreet for its XML-based e-business software, Ecora for IT risk management software and ForeScout Technologies for intrusion prevention. And more than a half-dozen of the start-ups have reshaped themselves. SilverBack Technologies is no longer a management services provider but a management tool vendor. Top Layer Networks is now a security vendor rather than an enterprise switch maker. NoWonder stopped being an online technical support site and became a provider of collaborative CRM software called ePeople.

Adaptability is clearly a good characteristic for a start-up these days, as is patience. Start-ups today must grow slowly and smartly, exercising business acumen to outlast this period of minimal IT spending and funding shortages. ■

Where they are	1998	1999	2000	2001	2002
Recently funded Operating off funding rounds closed in the last 12 months, to the tune of more than $160 million.			SilverBack Technologies Top Layer Networks	Arbor Networks	Egenera ForeScout Technologies Grand Central Communications MeshNetworks Proficient Networks Virtela Communications
Staying the course Operating off of funding received more than 12 months ago or on revenue.	Sitara Networks		Bowstreet Quantum Bridge Communications	Ecora GiantLoop Network Groove Networks	Boingo Wireless Intelliden Redline Networks
Keeping quiet Operating in quiet mode, with product details undisclosed.				Procket Networks Surgient Networks	Maranti Networks
On the Street Publicly traded.		Akamai Technologies Covad Communications Foundry Networks Red Hat Software			
Taken on new identities Operating under new names, with new strategies.		Manage.com (Cogency Software) Nextlink (XO Communications)	Loudcloud (Opsware) NoWonder (ePeople)		
Under new ownership Acquired.	AbirNet Aptex Software ArrowPoint Communication Bright Tiger Technologies NetSpeed NextPoint Networks Switched Network Technologies Torrent Networking Technologies Yago Systems	Bluestone Software Inktomi Network Alchemy Ukiah Software	Network ICE Riversoft	Access360 Asera	
In the corporate graveyard Folded.			2nd Century Communications Adero	Cereva Networks CoreExpress	



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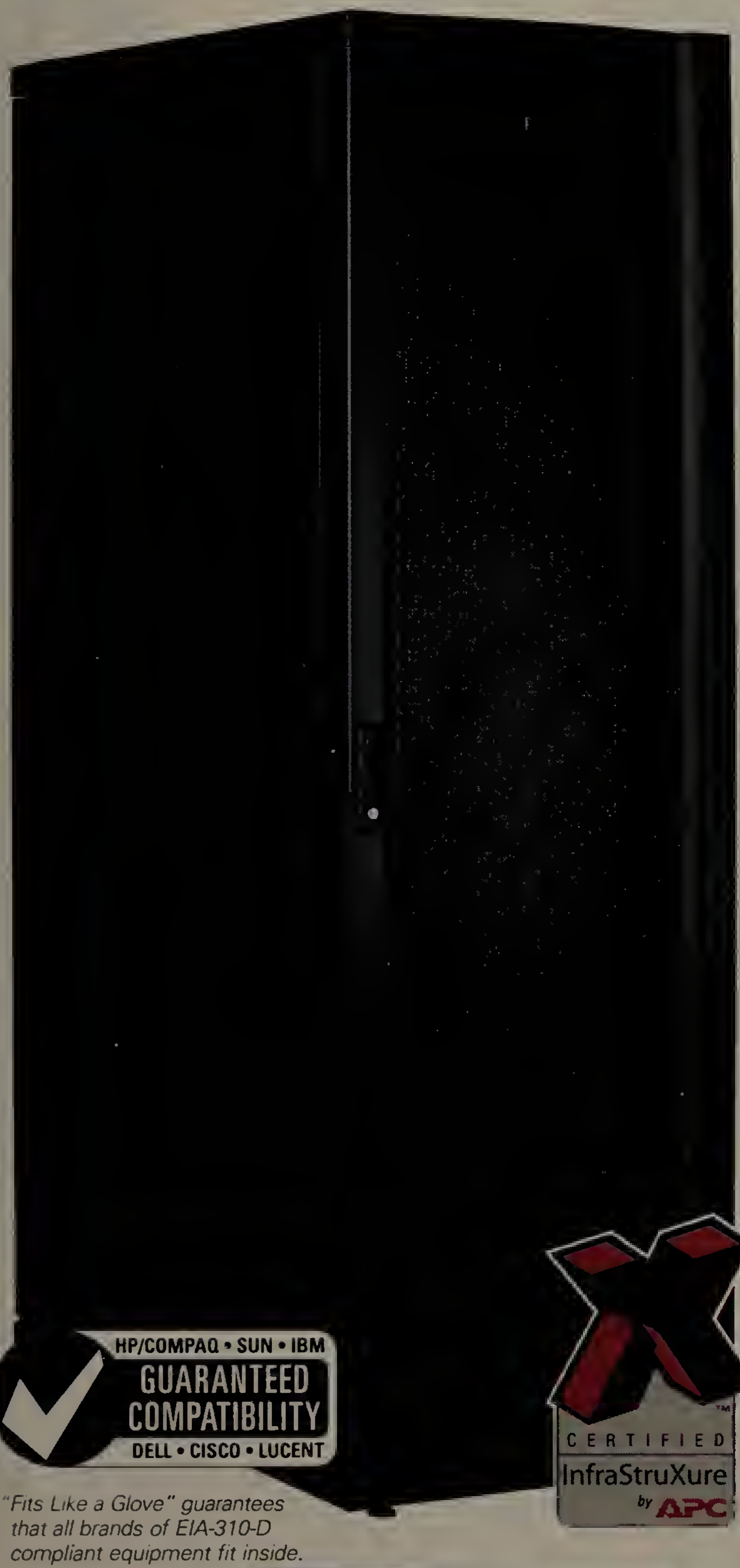

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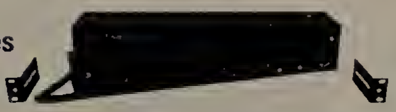

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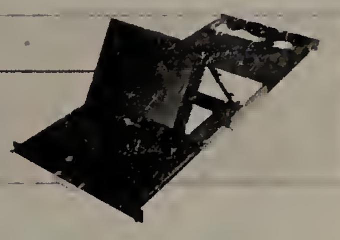

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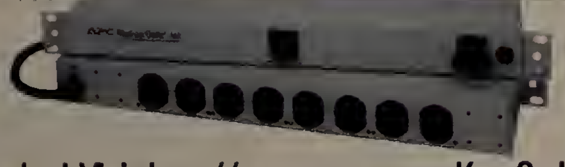

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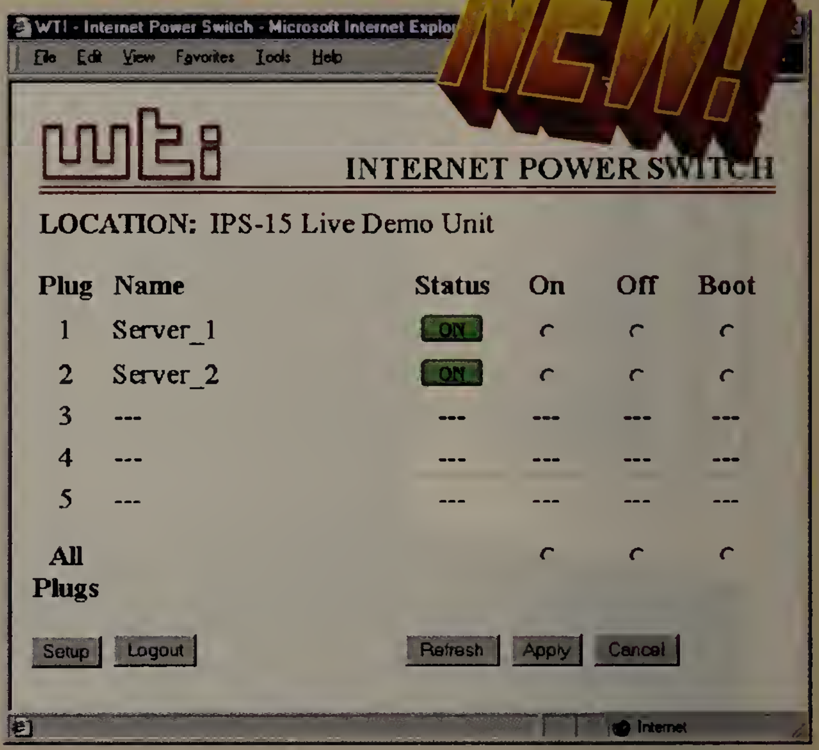
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Apply
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LOCATION: IPS-15 Live Demo Unit

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2	Server_2	ON	○	○	○
3	---	---	---	---	---
4	---	---	---	---	---
5	---	---	---	---	---
All Plugs			○	○	○

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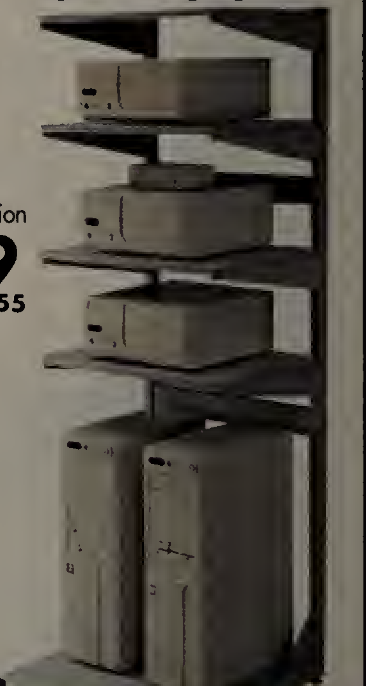

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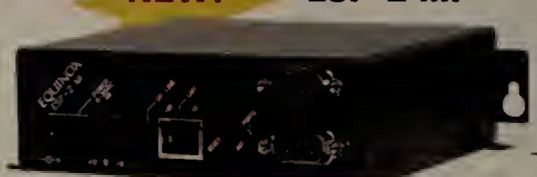

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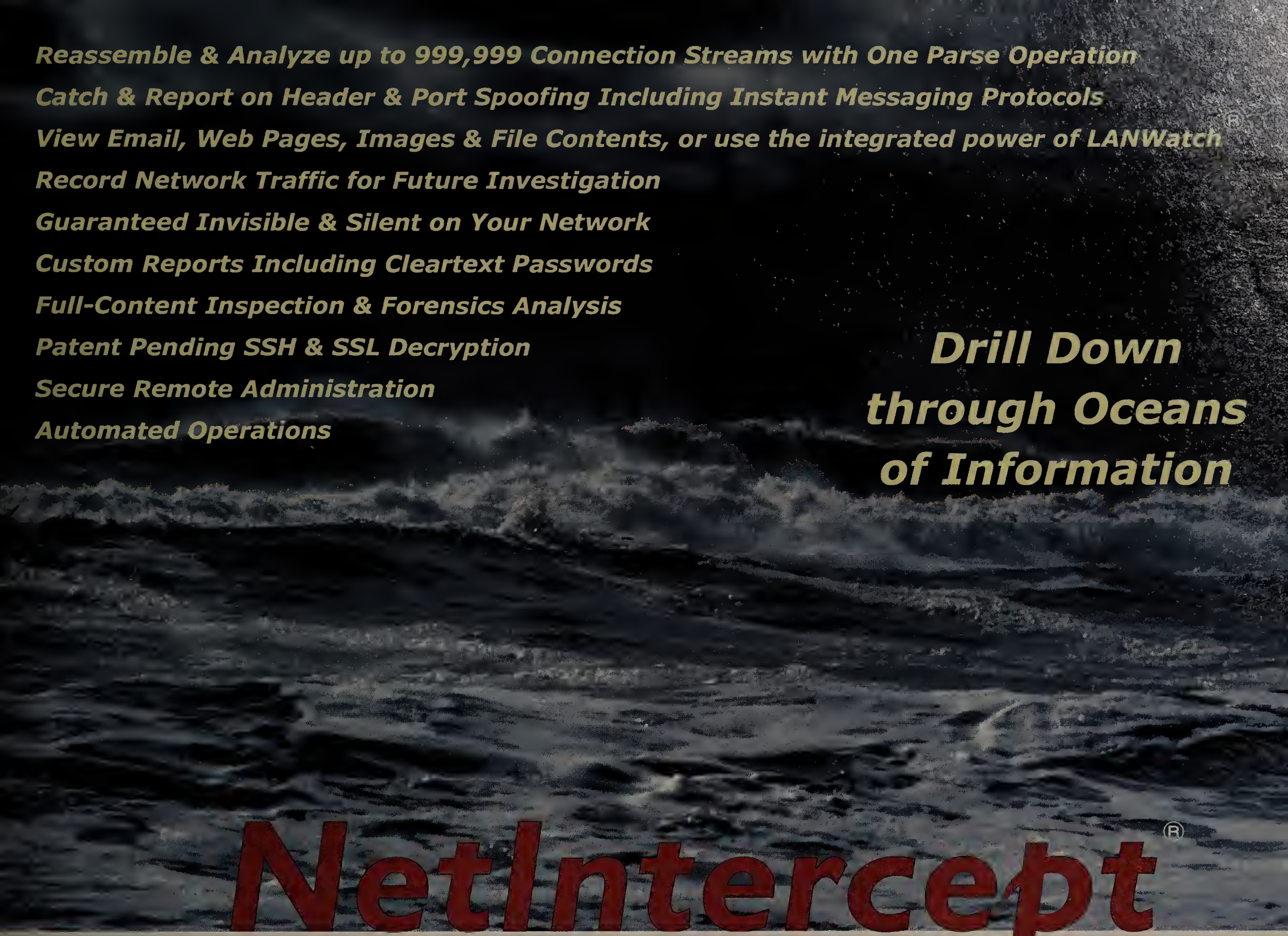

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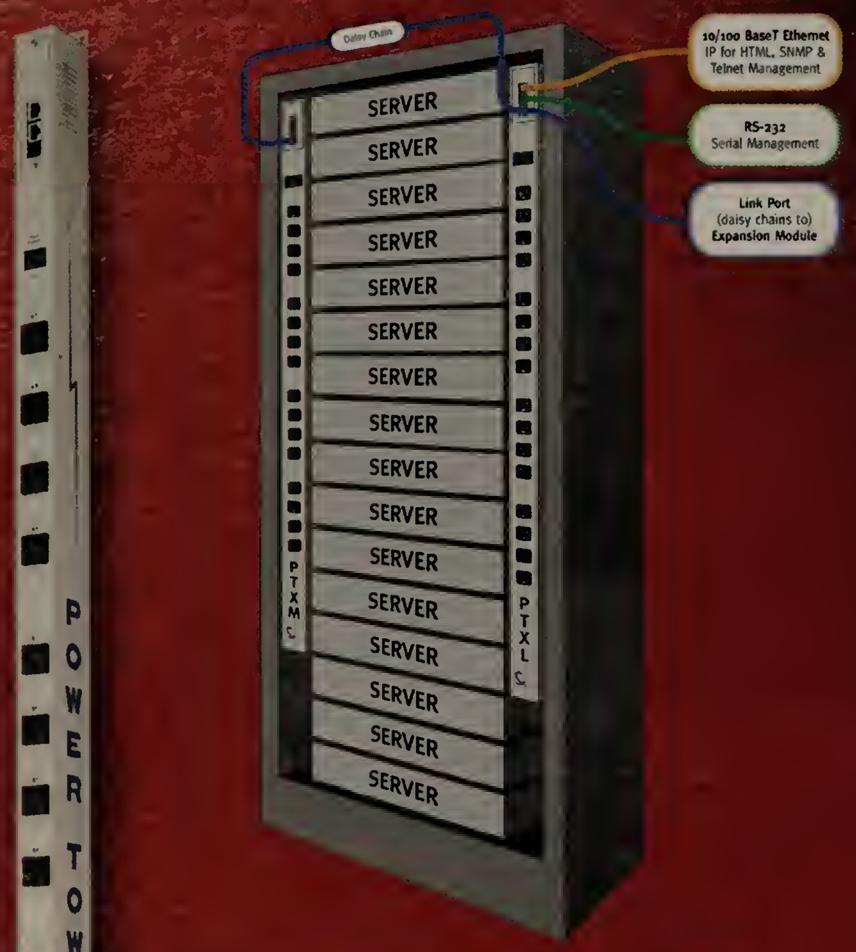
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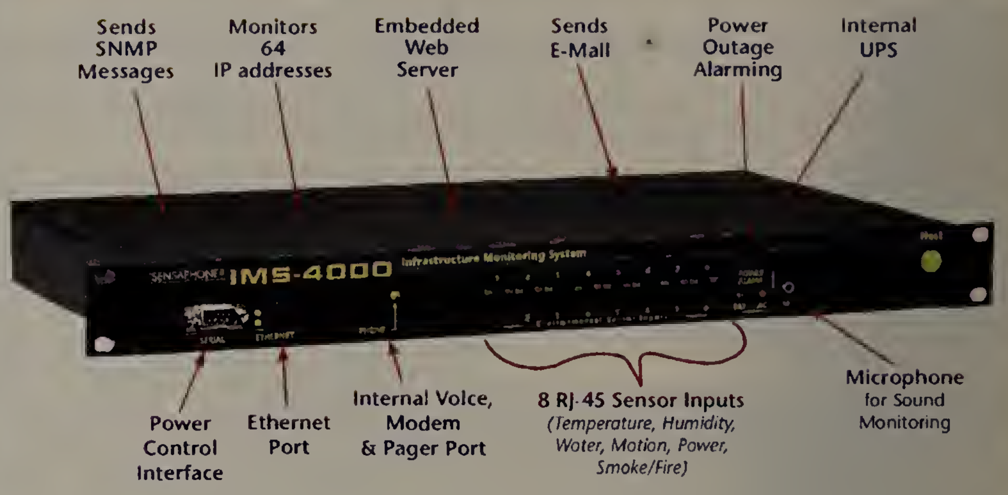
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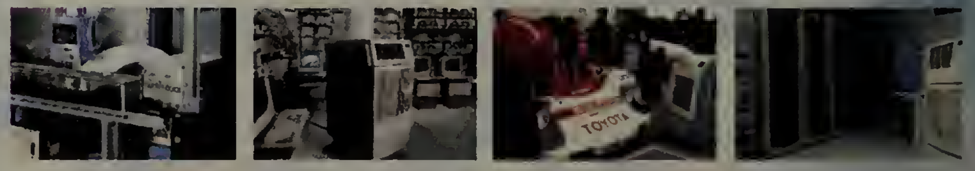

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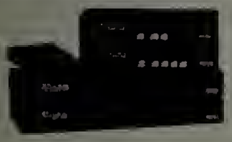

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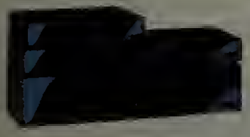

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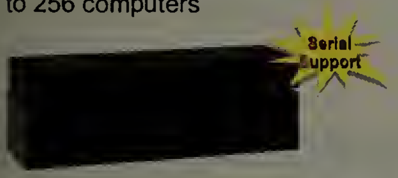

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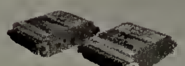

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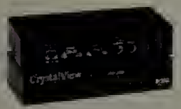

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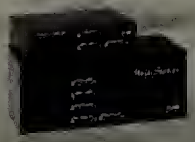

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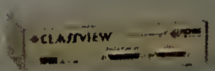

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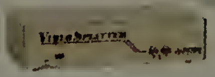

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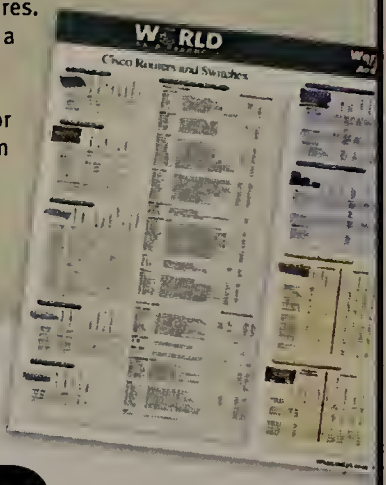

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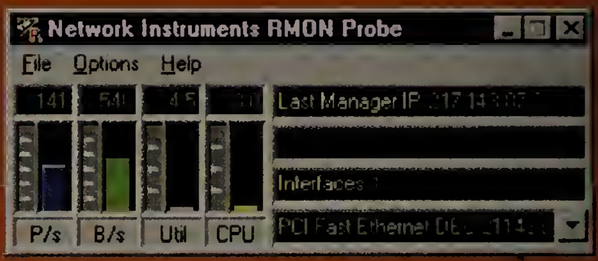

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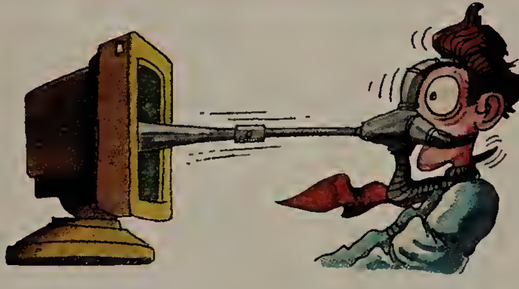

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Diane Morrell, vice president/director of research for the Gartner Group in Stamford, CT, says that employers are conducting a more thorough assessment of people to work in IT security. That's good news for IT professionals who have a track record for accomplishment, for remaining with a company for a reasonable amount of time and who have proven their ability to apply technology to entirely new situations. Not so much for people who have been job-hoppers and whose background would be difficult to track, much less qualify, for appropriate security clearances. "The assessment of people is receiving more scrutiny and is more acute than in the past," says Morrell.

Gartner Group's research indicates that there will be renewed focus on how government agencies, the military and corporations outsource basic transaction work in the IT arena. The cost has been driven down by outsourcing, an economic factor that has to play into the equation of how networks and systems are developed and how companies establish security criteria for their suppliers.

Morrell says the change in national security focus has speeded up the need to transition the national workforce to meet cost restraints and security. The result is a higher-level skill set for IT professionals here in the U.S. Traditionally, U.S. companies measure performance by demonstrable skills. Gartner Group predicts this will change. "It's the ability to synthesize knowledge versus academic training," Morrell explained. "The demand will be for an IT workforce that can design around and in between organizations, that is intuitive, that is fluent in skills and that can apply knowledge to entirely new spaces. You'll see a greater demand for higher order thinking to apply to research and development, nanotechnologies, biotechnologies – with the question of national security mixed in."

Hiring employers can't merely recruit or wait for resumes to cross the portal in this new paradigm. According to Morrell, successful hiring companies will constantly mine the IT workforce to identify those who have the sought-after competencies. "I think we'll see a lot of focus by companies on keeping their critical talent satisfied and with identifying new talent through their current employees. That puts an entirely new light on the company/employee relationship."

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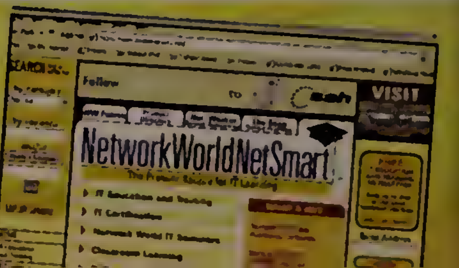

Principal Technical Support Specialist/Team Lead (User Support Analyst Supervisor) – Supervise staff of Support Engineers in performance of technical support services for customers & users of company's leading edge object oriented database & e-business platform systems. Will provide software solutions for customers w/ particularly complex tech. problems, review customer requirements, track tech. issues, identify potential software problems, engage in performance tuning, participate in test cycle of new products, generate reports & perform coding tasks as necessary using object oriented technology with C++, UNIX and/or Windows. BS in Comp. Sci. & 5 yrs progressive exper. in software programming/analysis or engineering & at least 2 yrs exper (combined or separate) in direct tech support engin. w/ customers & in programming in C++; requires proficiency in object-oriented programming, Visual Basic and SQL, & understanding of Object Store server process. Will accept MS degree in Comp. Sci. & 2 years specific exper in lieu of B.S. and 5 years. 40 hours/week; Salary: $88,468/yr. Send two applications to **Case #200115814**, Labor Exchange Office, 19 Staniford St 1st Fl, Boston MA 02114.

Software Engineer

Research, design and develop computer software systems for hand-held automotive diagnostic equipment. MS in computer science or engineering required. Job site in Detroit-based offices. Please send resumes to:

Vetronix Corp.,
HR Department
2030 Alameda
Padre Serra
Santa Barbara, CA 93103
No phone calls please.

Vetronix Corporation

Network Engineer - SNP Technologies is seeking a network engineer for its Hamden, CT office with CNE and MCSE certification, knowledge of Windows NT/2000 & Exchange servers, Cisco firewall & networks; experience in security aspects of networks, WAN & in administering databases, and 6 years of related experience. Please E-mail your resume to us at:: Resume@SNP.com.

Systems Analyst: Design, develop and implement software systems, incl. telephony, radio and satellite. Use expertise in C, SNMPC, GSM system, etc. 2 yrs exp. in job off'd or 2 yrs exp. in related pos. w/same duties & BS in Enng, Comp. Sci. or related. EOE. Contact: SP Software Solutions, Inc., 12320 Clairmonte Ave., Alpharetta, GA 30004.

Sr. Systems Analyst sought by pharma R&D Co. in Plainsboro, N.J. Candidate must have a Bachelor's degree in a comp. sci. or eng'g field & 5 years of IT exp or a Master's degree in a same field of study & 3 years of IT exp. Pharma. exp. preferred. Must have experience in Java, JSP, Java Servlets, Doclets (must have coded and used Java Doclets), EJB, JDBC & other J2EE technologies, HTML, ANT, XML, WebSphere V4.0 Application Server, WebSphere Studio Application Developer V4.0, Jbuilder, JProbe, Oracle, SQL, ClearCase and Rational Rose. UNIX exp. & exp. w/ other Object Oriented Languages (such as C++) a plus. Ability to work independently as well as in a large team environment in a senior role is also required. Must be able to ensure accuracy of system documentation & communicate effectively w/ development staff & information mgmt personnel. Send resume to: Strategic Staffing, Bristol-Myers Squibb Co., P.O. Box 4000, M/S E14-12, Princeton, NJ 08543, Job Code TD-806.

Software Developer II. Maintain prgm in Tempest Messaging Systm using C++; dvlp, implmt & maintain applic components & features; perform unit testing; dvlp applics using C/C++, MFC, VB. NET, C# & Managed C++; provide tech assistance to end users; write prgm & job stream documentation. B.S. Comp. Sci., MIS or rel. field + 2 yrs exp. as s/ware engr or similar duties under different job title, 2 yrs exp w/configuring & prgmg using Tempest Messaging Systm & dvlpg s/ware in CMM level 3 envrmt. Prgmg exp with: C/ProC/C++/C#, VB6, ActiveX, COM, MFC, NET Framework, & UML. Exp w/following dvlpr tools: PVCS Tracker; PVCS Version Mgr; NuMega Bounds-Checker; Visual Studio 6; Visual Studio.NET; MS Visio 7.0; & MS Installer. 40 hrs/wk, $50K/yr. Must have proof of legal auth to work in US. Send resumes to IA Workforce Center, 1700 S. 1st Ave., Ste 11B, IA City, IA 52244-2390. Please ref to JO IA1101667. Employer paid ad.

Network Engineer - SNP Technologies is seeking a network engineer for its Hamden, CT office with CNE and MCSE certification, knowledge of Windows NT/2000 & Exchange servers, Cisco firewall & networks; experience in security aspects of networks, WAN & in administering databases, and 6 years of related experience. Please E-mail your resume to us at:: Resume@SNP.com.

Software Engineer (with Masters degree and 1 year experience) - Williamsport, PA. Job entails and requires experience in design, development and implementation of applications using SAP (ABAP/4, FI, MM, HR, BW), Oracle, SQL Server, APO, JAVA, C and C++. Relocation within USA possible. Attractive compensation package. Send resume to Supriya Palayekar, Palayekar Companies, Inc., 1959 East Third Street, Williamsport, PA 17701.

Developer sought by oncology/therapeutics div. of pharma R&D co. in San Francisco, CA. Candidate must have a Bachelor's degree or equiv. in Computer Engineering or related. Min. of 5 years experience in application development & database design & development on Oracle platform required. Extensive exp. in OOAD, Object Oriented Programming, DBA, database design tools, data modeling tools (ERWin), SQL, PL/SQL, Unix (shellscripts, FTP automation), Java, Oracle 8i database, Oracle 11i applications (order fulfillment), Blue Martini CRM and HTML, pharma. pricing s/w customization required. Experience in pharma. pricing required. Must have strong analytical skills in pricing infrastructure, information services & data analyses, & excellent oral & written communication skills. Send resumes to: OTN, Staffing Dept., 395 Oyster Point Blvd., Suite 405, South San Francisco, CA 94080, Job Code: VM-764 or fax resume to: (650) 737-9576 or email to: jobs.otn@otnnet.com

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APPLICATION SYSTEMS ARCHITECT Responsible for application systems design, balancing optimization of application access with resource use factors. Design and construct application systems and develop requirements and design specification for new and existing applications. Create, revise and maintain document requirements for data, workflow, logical processes, hardware and operating system environment, interfaces with other systems, internal and external checks and controls, and outputs. Require: Bachelor's degree in Computer Science, Engineering, or a closely related field, with 4 years of experience in the job offered or as a Software Programmer/Consultant, Experience must include 2 years of application systems design experience using Visual Basic and SQL Servers; Send resume to: Recruiter - Human Resources, AgFirst Farm Credit Bank, P.O. Box 1499, Columbia, SC 29202. (No Phone Calls Please).

Software Engineer wanted at NY Office of Empact Solutions to design, develop, test and implement EyeQ software. Experience with Websphere, WSAD, JAVA, J2EE, JSP, Struts, SLA-standards, Servlets, LDAP, CVS, Apache, Linux/UNIX and Win2000. Must have design, analysis, and modeling capabilities of business requirements using UML and RUP. Capable of interfacing with marketing and customer care groups. Data Mining, Statistics, Trend, Predictive and Inference Analysis capabilities. Database knowledge: DB/2, Oracle, MySQL, or Sybase. Object oriented design and programming required. Should have a Master's Degree in Computer Science or Engineering and have at least 2 years experience. Send to NY Recruiter at careers@empactsolutions.com referencing code SSNGG.

SOFTWARE ENGINEER

Design, develop and test computer software for business and scientific applications applying principles and techniques of computer science, engineering and mathematical analysis. Analyze software requirements for feasibility of design and hardware interface. Develop N-Tier applications using expertise in Visual Basic 4.0/5.0/6.0, and develop Web-based applications using expertise in ASP/Visual Interdev 6.0/ASP.Net/VB.Net/XML, XSL. and DOM, IIS, Web Sphere, Oracle Web Server. Requirements: Bachelor's degree in Computers or Engineering and 5 yrs. experience as a software engineer. Knowledge of applicable skills. Salary: $70K/yr. 40 hrs/wk. Apply: Supervisor, Indiana County CareerLink, 300 Indian Springs Rd., Indiana, PA 15701. Refer to Job Order No. WEB 320787.

Database Administrator - SQL wanted to oversee efforts associated w/ the planning, admin., & oper. support (24-hr. by 7-day) of client/server database mgmt. systems (DBMS) & related technologies in a multi-vendor, multi-platform computing environ. Resp. incl.: installation & maintenance; storage planning & utilization monitoring; performance/availability monitoring, debugging & problem resolution; backup/recovery configuration & data integrity monitoring; data archive design & mgmt.; batch execution scheduling; transactional integration/ interfacing; security configuration & monitoring; programming standards development & quality control; evaluation, selection, & integration of DBMS tools & technologies. May provide assistance for the following application development functions: Legacy DB migration; DB design, development & testing; application program installation/upgrade; Enterprise-wide storage mgmt. & business continuity planning; DB development & standards training. Must have Bach. deg. in Comp. Sci., M.I.S. or related field & 3 yrs. exper. in a database programming/support environ., incl. admin. on-call support & database admin. exper. as well as exper. supporting client/server applications in a MicroSoft NT or UNIX environ. 40/hr/wk. Salary $75,000/yr. Send 2 resumes to Case# 200201128, Labor Exchange Office, 19 Staniford St., st Fl., Boston, MA 02114.

IT Consultant (Business Process Analysis): Perform systems requirements analysis including considering and evaluating alternative solutions as well as aiding and providing functional design plan. Produce systems specification and perform systems and component engineering. Working with clients to conduct testing including integration testing using a variety of software engineering tools. SQL and Object Databases. Conduct Business Process Analysis of the client's business and provide systems maps for the same. Assisting clients in project management, planning and implementing change management programs and post-implementation evaluations. Working with clients in implementing systems and component test plans development. Requirements include a Master's degree or equivalent in Business Management, an Engineering discipline or related field. No work experience required. Requires 70-75% domestic/international travel. Applicants must have unrestricted authorization to work in the United States. Salary: $85,000/year. 40 hours/wk. Respond with two copies of resume to Case #200201020, Labor Exchange Offfice, 19 Staniford St., 1st Fl., Boston, MA 02114.

SYSTEM SUPPORT SPECIALIST

Design, develop and test computer software for business and scientific applications applying principles and techniques of computer science, engineering and mathematical analysis. Analyze software requirements for system support and administration of IBM RS/6000, Sun Solaris, HP-UX, Microsoft Windows NT and 2000 using expertise in IBM Development Tivoli Enterprise Management applications, Tivoli Framework, Tivoli Distributed Monitoring, Tivoli Enterprise Console, Tivoli Netview and Tivoli Storage Manager, BMC Patrol, Tera Term SSH, use of Perl, Shell Scripting to automate the operations and LAN, WAN, Cisco, Nortel based network devices. Requirements: Bachelor's degree in Computer Science and 4 yrs. experience as a system support specialist, software engineer or programmer. Salary: $64,240/yr. 40 hrs/wk. Apply: Manager, Beaver Co. Team PA CareerLink, 2103 Ninth Ave., Beaver Falls, PA 15010-3957. Refer to Job Order No. WEB 320777.

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The MathWorks leads the market in developing and delivering high performance interactive software products such as MATLAB® to the engineering and scientific communities. We have the following positions available at our offices in Natick, MA.

- **Training Engineer**
- **Numerical Analyst**
- **Simulink/Real-Time Workshop DSP Developer**
- **Technical Consultant**
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- **Senior Communication Quality Engineer**
- **Senior Simulink Applications Quality Engineer**
- **MATLAB Community Online Manager**
- **Senior Software Engineer**
- **Applications Engineer**
- **Simulation & Real-Time Technologies Developer**
- **DSP Blockset Applications Senior Team Leader**

The aforementioned positions are available at all levels and require a minimum of a B.S., M.S., or Ph.D. and 0-8 years experience.

Additional Opportunities in the Following Areas:

- **Software Development**
- **Human Resources**
- **Product Training**
- **Technical Marketing**
- **Finance**
- **Marketing**

For fastest consideration interested candidates should e-mail their resume, indicating position of interest, to resumes@mathworks.com.
Attn: Human Resources - Job Code: CW403,
The MathWorks, Three Apple Hill Drive,
Natick, MA 01760-2098.

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DATABASE ANALYST: Duties include: DBA Administration support for 15 applications as primary and 20 applications as secondary DBA for Group, E-business, Investments, Individual and CIS business units. Under general supervision, DBA is responsible for: Physical database design and optimization from logical models utilizing modeling tools. Implement and maintain databases and database utilities on MS SQL server and Sybase SQL Anywhere. Administer security within DBMS facilities. Definition and maintenance of replication and transformation products (DTS) and facilities. Perform database change requests and assist application community with application tuning. Install, configure and upgrade DBMS software and databases; and apply service packs. Maintain daily monitoring scripts and alerts. Min Reqts.: BS/BA (foreign equivalent accepted) in CS, IT, EE or related AND 4 years of experience in the job offered OR 4 years experience with database design and administration. PLUS, must have demonstrated knowledge and work experience with: (1) Logical and physical data modeling, warehousing, design and installation of large distributed environment database systems; (2) MS-SQL Server, Oracle, UDB & SyBase environments; and (3) T-SQL, Perl Script, Power Design and ASP technologies. Basic pay range is $69,100-$75,500 per year FT and standard company benefits. EEO. Submit 2 resumes and respond to Case No. 2001 16632, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Consultant Software Engineer /Developer to serve as a lead technical consultant responsible for analysis, design, development, and implementation of business applications for both internet and intranet. Will work with team of developers using Java and C/C++ under Windows and UNIX to develop, test, and debug client/server applications in development environments including IBM Websphere, IBM VisualAge and MS Visual Studio. Will perform all graphical user interface (GUI) and database development for various systems. Will establish and monitor project plans, working directly with user community for project definition. Will provide technical evaluation estimates on Initiatives and maintain user-external group relationships. Requires Bachelor's degree in Computer Science, Engineering, Mathematics, or Physics plus four (4) years experience in job offered OR four (4) years experience developing client server applications. OR, in the alternative, Master's degree in Computer Science, Engineering, Mathematics, or Physics plus two (2) years experience in job offered OR two (2) years experience developing client server applications. Candidate must also possess demonstrated expertise performing object-oriented analysis and design in architecting large scale applications; demonstrated expertise developing GUI and Engines for large scale applications using JAVA, and demonstrated expertise in database installation, stored procedures and performance tuning in ORACLE or SYBASE. Salary: $92,200/yr, M-F, 9AM-5PM. Send 2 resumes to Case #200116231, Labor Exchange Office, 19 Staniford St., 1st fl., Boston, MA 02114 EOE. Applicants must be eligible to accept full-time employment in U.S.

Senior Software Engineer. Design, implement and test data communication products. Work in C, C++ and Assembly to help deliver communication products to the company and customers. Design and develop low level system drivers for communication with TCP/IP stack and other networking layers. Design and develop test suites to actively test and passively monitor various services enabling real-time, pervasive and flexible monitoring of the IP network. Perform development using expertise in TCP/IP, RTP/RTCP, SIP, Radius, DNS, HTTP, SMTP, POP3, IMAP and various other IP based protocols. Perform development and debugging on Power PC based architectures using OSE. Requirements include a Bachelor's degree or equivalent in Computer Science, an Engineering discipline or related field and four years of work experience in related field of software development. Applicants must have unrestricted authorization to work in the United States. Salary $83,960/year. 40 hours/wk. Respond with two copies of resume to Case #200200499, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

Inventory Systems Analyst (Memphis, TN) – Collection and analysis of warehouse operations data in Excel, including capacity levels, replenishment levels and reporting of inventory data. Responsible for setting up queries of Microsoft Access, SOL, and Relational Database Management tables to facilitate data retrieval of pertinent inventory stocking and shipping information. Designs and implements warehouse process flow by effectively building putaway, picking, and replenishment instructions. Must have a Bach. Deg., or foreign deg equiv., in Business Admin., Mgt. Info. Sys, or related field. Must have 2 yrs exp. in the job offered OR 2 yrs exp. as a Systems Analyst. Exp. mentioned may have been obtained concurrently and must include 2 yrs of exp. in each of the following: Microsoft Access Query, Excel, SQL, and Relational Database Management. Must have proof of legal authority to work in the U.S. Submit resume to: A. Malone (REF:ISA), Human Resources, 1800 Pyramid Place, Memphis, TN 38132.

MIS/Programmer Analyst wanted by Driktech, LLC, a small fast growing company. Candidates must have minimum bachelor's degree with exp. in IT project management and sales. Attractive wage with full benefits. Please contact 1850 Timber Trail, Ann Arbor, MI 48103. EOE.

Corporate Computer Services (CCS) has multiple openings for System/Programmer Analysts for both entry & experienced levels (minimum BS). Skills in following areas C/C++, VB, Oracle are plus. We are small but we do not lay off. Attractive wage w/ benefits. Apply HR@ccsiusa.net.

IT Instructor
Taylor Business Institute, an educational institution seeks to fill the position for an IT Instructor in Chicago, IL and unanticipated locs in US. Must have BS and 2 yrs s/ware experience. Respond by resume to Attn: Janice Parker, Taylor Business Institute, 200 North Michigan Ave., Suite 301, Chicago, IL 60601.

SOFTWARE CONSULTANT

Analyze & evaluate existing or proposed software systems. Dsgn, dvlp, implement & improve programs, sys. and related procedures to process data using in-depth knowledge of the software dvlpmnt life cycle. Encode, test, debug & install operating programs & other sys. software utilizing knowledge of RDBMS environments & programming languages. Bachelor's (or equiv.) in Comp. Sci., Math, Engnrg, Bus., Commerce or Comp. Info. Sys. + 2 yrs exp. in position offered or as a Software Engnr, Prog Analyst or Sys. Analyst/Mgr/Admin. reqd. Exp. must include: (a) Oracle or Sybase RDBMS environments; and (b) Java or Cobol or PL/SOL programming languages. High mobility preferred. 40 hrs/wk, 8 am - 5 pm, $64,240/yr. Qualified applicants submit resumes to Site Administrator, Greene County Team PA CareerLink, 4 West High Street, Waynesburg, PA 15370-1324. Please refer to Job Order No. WEB 316659.

Senior Notes Application Developer wanted to provide tech. expertise in core application development technologies; handle all aspects of most tech. projects like systems analysis, design, development, quality assurance, installation & maintenance under limited guidance; interact with division mgmt. on tech. planning issues; provide programming solutions for complex business processes involving workflow, tracking & other tech. problems using Lotus Notes & Domino; design applications that interact with existing Database Management Systems (DBMS) such as Oracle DB2 using Open Database Connectivity (ODBC) tools; set up access control for the applications using Domino's security features. Must have Bach. deg. in Comp. Sci., Eng. or related field, & 3 yrs. exper. with Lotus Notes, incl. exper. in website technology & developing workflow projects. 37.5/hr/wk. Salary $94,080/yr. Send 2 resumes to Case#200201110, Labor Exchange Office, 19 Staniford St., st Fl., Boston, MA 02114.

Oracle Application Engineer -- Develop application software using Oracle Technologies database in the back end and Developer 2000 (Forms6i/Reports6i) in the front end. Apply expertise with Oracle PL/SOL, application server, and stored procedures to assist in the development of Intranet/Internert applications and reports for Company. Provide application support to all user departments. Requirements: B.Sc. in Computer Applications, Comp. Science, Computer Engineering, Electrical or Mechanical Engineering and 2 years experience in job offered or 2 years in software development in Oracle or Java Technologies. Candidate must also possess demonstrated expertise developing applications, forms and reports using Oracle technologies; demonstrated expertise developing applications using On-line Transactions Processing (OLTP). Will supervise 0-3 employees. Salary $72,000/year, M-F, 9:00-5:30. Send 2 resumes to case Number 200200548, Labor Exchange Office, 19 Staniford, 1st Floor, Boston, MA 02114 EOE. Applicants must be US workers eligible to accept full-time employment in US.

Full time position to work as System Engineer, Need knowledge of using Programming skills in C, C++, PL/SQL, shell scripts, Tru64 Unix, DSP, Assembly and RTOS: pSOS, Vxworks. Tools: GDB, XDB Debugger, Object Browser, pROBE +, LABTOOL48, Oscilloscope, Customized Simulators, ADSP-2101 Software simulator, WinRunner 6.0 SCADA: LABVIEW, Wonderware, onsite Requires Bachelor's degree in Electronics or equivalent and 2 years of experience in the job offered. Applicants send resume to Pyramid Consulting Inc, 8665 Providence Drive, Noblesville, IN 46060.

SENIOR PROGRAMMER/ ANALYSTS

MARA CONSULTING, INC., a California-based Corporation, has immediate openings for Senior Programmer/Analysts with at least five years' experience in Natural/ADABAS/Programming who have worked on IBM mainframe platforms utilizing MVS/XA ESA and OS/390 Operating Systems. Applicants must also have at least four years of formal academic training in computer data processing, Computer Science or a related field culminating in government diplomas or a Bachelor's Degree. Must be willing to travel from the Sacramento, California area to temporary work sites throughout the United States to be paid, at least, the prevailing wage in that area. Employees will remain employed by MARA CONSULTING, INC., (www.maraconsulting.com) with continuing benefits. Send your resume with current address and telephone number to MARA CONSULTING, INC., 8577 Almond Bluff Court, Orangevale, CA 95662 or email to maracons@pacbell.net. EOE

Senior Design Engineer: Design, provide specifications and implement software for optimizing UNIX and Windows NT systems connected to company storage system products. Develop and test collectors, agents and programming interfaces to APIs, operating systems, and relational databases. Use variety of languages such as C/C++, SQL, JDBC and Java. Requirements include a Bachelor's degree or equivalent in Computer Science, an Engineering discipline or related field and at least five years of progressively responsible work experience in the job offered or related field of software engineering. Applicants must have unrestricted authorization to work in the United States. Salary $105,000/year. 40 hours/wk. Respond with two copies of resume to Case #200200859, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

Paymap, Inc., a Division of First Data Corporation, a company in Greenwood Village, CO has an opening for an Application Architect to work in San Francisco, CA. Analyze, design and develop applications software for company's direct marketing team using Java, JSP, Enterprise Java Beans, Cold Fusion, and PL/SQL. Requires bachelor's degree in computer science, engineering, or related field; 2 years as a software engineer; and working knowledge of Java, JSP, Oracle databases and PL/SQL. Respond by resume to Norm Bamett, First Data Corp., 12500 E. Belford Ave., Mail Stop M21B12, Englewood, CO 80112 and refer to job #4440MA.

Database Analyst needed for IT Consulting Firm. Position will plan, coordinate, and implement security measures using PKI, LDAP, JAAS and Virtual Private Database. Candidate must have experience with: Red Hat Linux (cluster servers for Oracle RAC), SUN Solaris and HP-UX (awk, gawk scripting). Oracle 8i, 9i design, administration, sizing, capacity planning, rman and statspack.. Installing (10.7, 11.0, 11.5), patching, upgrading and cloning Oracle applications. This is a full time position. A Bachelors Degree in Computer Science or related field is required as well one year of experience. Please mail resumes to Tomlyn Mathews, Venties Solutions, LLC, 8084 RFD, Long Grove, IL 60047

Sr Internet Software Developer, TSYS. Lead a distributed team of developers towards successful project execution; work w/ lead Architect, business analyst, and project manager in designing and developing solutions for client and/or product; perform functions of developer, system analyst, designer & tester; and implement web-based n-tier applications using Object Oriented conceptual skills.

Competitive Salary. Bachelor's degree or equivalent in Computer Science + (5) yrs total of experience as Software Engineer including (3) yrs in server side technologies/tools such as J2EE (JSP, JMS, EJB, Servlets, JDBC), XML, BEA Weblogic or other Java application server, ORACLE PL/SQL, C++, OOAD using tools like UML, TogetherJ, Rational Rose, Design Patterns, with (1) yr Enterprise Application Integration (EAI) using technologies such as CORBA and MOMs. Must have legal authority to work in the U.S. Please send resume demonstrating all minimum requirements to TSYS Attn: Kem Alexander, 1600 1st Ave. Columbus, GA 31902.

Programmer Analyst, 40-hr wk, 8 - 4PM, Bachelor's or foreign degree equiv. in Computer Science or Computer Engg. or Electrical Engg.+ 2 yrs exp. in job offered or 2 years as Systems Analyst. Analyze, review and rewrite programs; prepare records and reports; consult with staff and users to identify operating procedure problems; formulate and review plans regarding steps required to develop programs; devise flow charts and diagrams; modify programs. Resume to Dianna-Andrea Corp., 4210 NW 4 St., Miami, FL 33126.

Seeking qualified applicants for the following positions in Memphis, TN: Senior Systems Programmer. Devise procedures to solve complex systems and applications problems. Requirements: Bachelor's degree* in computer science, MIS, engineering or related field plus 5 years of experience in systems programming. Experience with UNIX, C and logistics code development also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Sibi George, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V.

Technology Support Manager - for non-profit organization to manage and implement all internal IT solutions including network support, troubleshooting, and internal helpdesks, for Windows 2000, XP, and Exchange Server environments. Position requires degree or experience. Send cover letter and resume (no calls) to A. Marano, NPower NY, 145 W. 30th St., 8th Fl, NY, NY 10001.

Programmers with advanced technical skills to program interrelated business operations and merchandising applications. Skills to include ERD, DSD and dataflow diagramming. Send resume to Human Resources, Attn: SL, Req #333, Cleveland Indians, P.O. Box 94954, Cleveland, OH 44101-4954. EOE.

Programmer Analyst needed w/exp in using Java, VB, C++, JDBC, Weblogic, XML, XSL, ASP, IIS, LDAP, Sybase, SQL Server & Oracle on Windows NT & Unix Platforms. Send resumes to Open Systems Technologies, Inc., 8 Winter Street, 6th Floor, Boston, MA 02108

Programmer/Analyst: Analyzes, designs, develops and modifies client/server based applications, to facilitate access, analysis and report generation using, novell/java and mathematical regression algorithms for accounting department. Position requires Bachelors degree in computer science or equivalent and two years experience in job offered. Send resume to 5200 Vineland Road, Suite 200, Orlando, Florida 32811, Attention: Laurie Mooty.

Seeking qualified applicants for the following positions in Memphis/Collierville, TN: Senior Programmer Analyst. Formulate/define functional requirements and documentation based on accepted user criteria. Requirements: Bachelor's degree* in computer science, MIS, information technology, engineering or related field plus 5 years of experience in systems/applications development. Experience with Java; either C or C++; and development of transactional distributed systems/applications also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to Sibi George, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V.

Programmer Analyst, Wilmington, DE. Bachelors in Comp. or Electronics or MIS + one year exp. in design, develop & implement net enabled applications utilizing Java, HTML, XML, Java/RMI, CORBA, EJB, ASP/JSP, C, SQL, and PL/SQL and do OOP using C++ and C # for Windows 95/98/NT & Unix; design GUI using VB, Web sphere, Visual Age for Java and Developer 2000; design & develop RDMBS using Oracle, SQL Server, MS Access, DB2 and generate reports using JDBC, Forms 5.0, Reports 2.5. Respond to HR Dept, Neotech Solutions Inc., 1170 Broadway, Suite 314, New York, NY 10001.

Programmer Analyst - Pharmaceutical/Life Sciences Co. seeks Programmer Analyst-LIMS to do systems development, software testing, technical writing & provide support for scientific-related systems. Reqs. masters degree w/ concentration in CS or MIS, software development life cycle (SDLC) expertise in the pharmaceutical industry & lab-based science background Send CV & salary requirements to Aventis Behring, LLC att: Jill Hansen, 1201 N Kinzie, Bradley, IL 60901.

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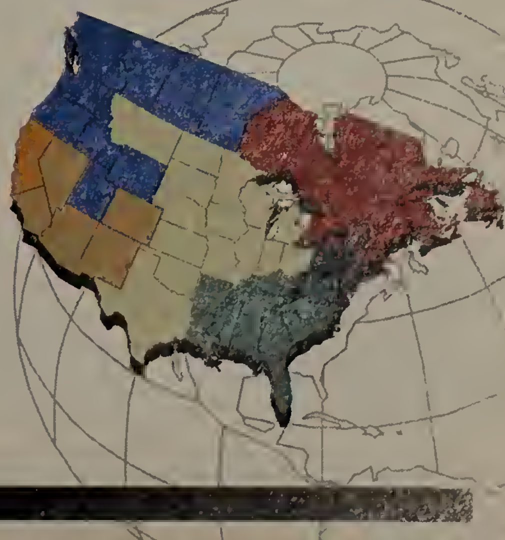

BackSpin Mark Gibbs

Aiming for perfection

Men do not like to admit to even momentary imperfection. My husband forgot the code to turn off the alarm. When the police came, he wouldn't admit he'd forgotten the code ... he turned himself in.

— Rita Rudner, comedian

If there is one lowdown trick that computers do to us humans it is to offer the possibility of perfection. This dirty ruse appears in everything we do with computers, including programming, using and managing them.

The problem is that computers are conceptually deterministic: We expect that they will do what they are told to do. "Add 2 and 2," you command, and you expect "4." Every time.

We then extend that assumed infallible behavior to increasingly complex calculations for which verification of the results becomes as difficult as the calculation itself. And we're surprised and exasperated when things don't work as we expect.

Just think of those humongous spreadsheets you've built in which everything works fine until you move some block of calculations to somewhere else and then modify a formula. Argghhh! Four hours later and you're still trying to get back to where everything seemed to work right.

There are three core problems: Computers do not always work perfectly because components fry and even cosmic rays can randomly flip memory bits; there is no way to verify that they have been programmed correctly; and they are used by humans.

The reason people shouldn't use computers is computers are too complex. A common truism is that humans can keep no more than seven ideas or thought objects in mind simultaneously, and most computer software presents us with far more simultaneous objects than seven at every turn. Is it any wonder that software is hard to learn and use?

But we, as IT people, know that computers aren't perfect yet, like everything, and we often are fooled into believing the opposite and get caught when they fail. But we're IT guys — when it happens, we get it, we understand.

Unfortunately, that myth of computer perfection is hard to shift in the rest of the organization. Sure, people know that computers go wrong, but they see those failures as IT's fault and something to be fixed. In essence, they expect the reliability of a top-end Japanese car for the price of a bicycle.

The trouble is that IT groups have a tendency to want to appear to have godlike powers; they want to exemplify the potential perfection of the supposedly perfect machines for which they are responsible.

There are only two solutions. The first is to simplify. Remove the layers upon layers of complexity that characterize our systems and the level of perfection will improve. The second is to spend a lot more time on design and testing. The more understood and architected a system is, the more reliable and easier it will be to fix.

The first solution is tempting but has the downside that the feature set will be limited. However, the implementation and operating costs will be low. The second solution is daunting as it will take a lot of time and money to create systems this way, but while the implementation will be expensive the operation costs will be reduced.

Most of us exist in that twilight zone between these two solutions. Our systems have parts that are simple and others that are complex, and each of those categories has elements that are well-designed and others that have been cobbled together. And the reason is simple: Economics and political pressures forced things to be that way.

So if you want to appear to be as perfect as the machines you manage, you must get your organization to spend and wait or simplify, simplify, simplify.

So which is it going to be? Or can you admit to imperfection?

Take your best (or even perfect) shot at backspin@gibbs.com.

'NetBuzz News, insights, opinions and oddities

By Paul McNamara

Customer wasn't asking for much

You can't expect a lot in the way of technical support from those free e-mail providers, even if you're kicking in a few bucks to get the so-called premium service.

But no meaningful support at all? . . . From Microsoft?

That's what Scott Matthews says he got for his money when he signed up for MSN Extra Storage through Hotmail, an account he uses as a target in-box to test his company's internal e-mail servers. Matthews recently encountered this message when he tried to log on:

"We apologize, but your account is temporarily unavailable. This delay does not affect the entire site or relate specifically to your account, but the machine that holds your account information is temporarily unavailable. We do not expect this delay to last much longer, so please continue to check our site for your account status."

The word "temporary" apparently means something else to Hotmail than it does to the rest of us.

"The message has been there for weeks," Matthews wrote in an e-mail sent here recently. "Finally, today, I got fed up and contacted — or tried to contact — Hotmail."

What he encountered was one of those maddening trips through sorry-but-I-can't help-you hell. Since I cannot do his version of the tale justice — it's twice the length of this column — you can read the e-mail at www.nwfusion.com, DocFinder: 5543.

In a nutshell, Matthews was passed from polite-but-unhelpful person to polite-but unhelpful person. His e-mails to Hotmail elicited polite-but-unhelpful canned replies. When all was said and done — and a lot was said and done — he was no closer to knowing how long "temporary" might be than when he started. He even tried to cancel his account, which had just been renewed, so he could get a refund and wash his hands of the whole unpleasantness. No can do, he was told.

About a week after he gave up, the service was restored.

"I just kept trying [to log on], and suddenly the service came back. Nobody contacted me," he said.

Companies that won't give their customers the time of day often will jump to it when a reporter's on the line and it's clear bad press is in the offing. So I tried to get an explanation from Hotmail.

"We sincerely apologize for Mr. Matthews' experience and are working with him directly to rectify the situation immediately," a Microsoft spokesman replied by e-mail, which was good because I had to stifle a laugh after reading the word immediately. "Customer support for MSN Extra Storage is currently provided via the chat function and through e-mail. We are expanding those offerings to include phone support in the near future to more thoroughly assist our customers and their needs."

Chat and e-mail might be useful if you can access your account. If you can't, as was the case here, well, don't hold your breath waiting for that phone support.

But there was more: "After reviewing Mr. Matthews' account further, it appears the issue resides with the cookies and cache within his computer's browser."

Hmm, that sounds suspiciously like blaming the victim, which is pretty much how the victim saw it.

"The issue couldn't have had anything to do with cookies, as I tried to access the service from a number of computers, including freshly rebuilt machines in our test lab," Matthews says.

The Microsoft bashers will look at all of this and say, "What do you expect?"

The answer, of course, is better.

You've just read 'Net Buzz No. 200 authored by yours truly; four years, give or take vacations and paternity leave. A big part of what keeps this fun, at least on my end, is that I get paid to do it. Another is swapping e-mail with readers, at buzz@nww.com.

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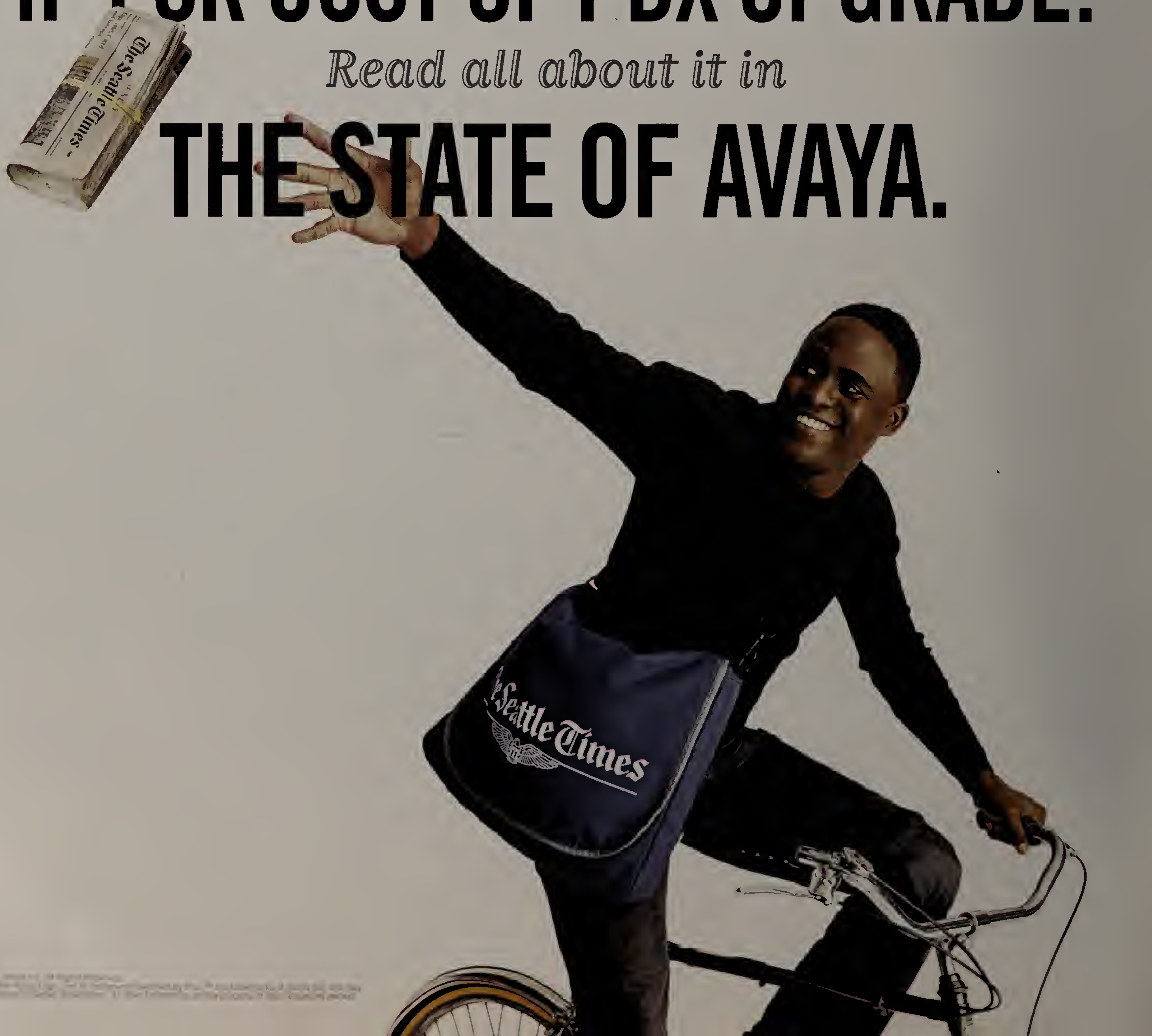

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